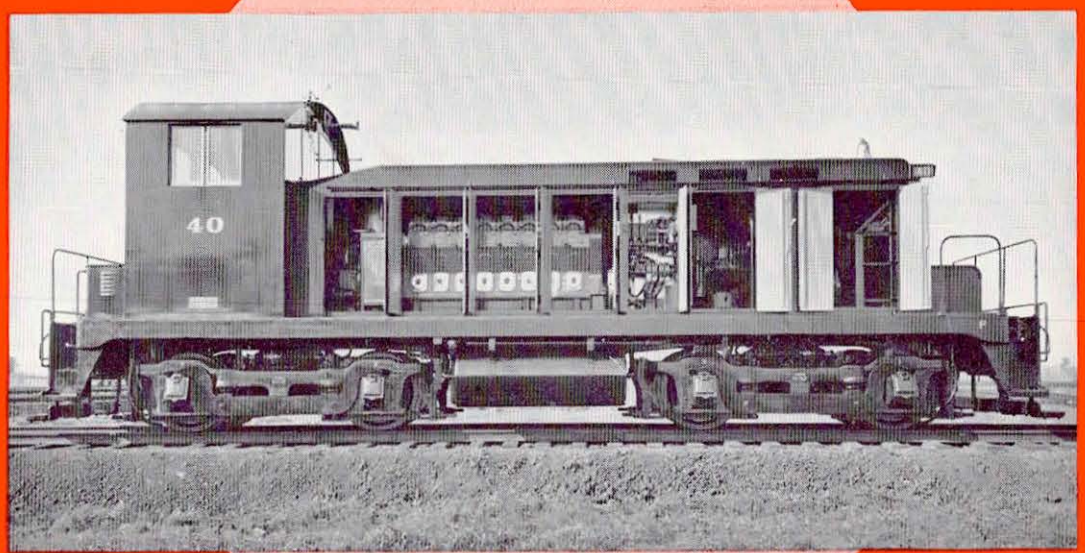
AUGUST 22, 1936

Railway Age

Founded in 1856

McCARTNEY LIBRARY
GENEVA COLLEGE

QUICK ACCELERATION · HIGH FUEL ECONOMY · LOW REPAIR
COST · EXCELLENT VISIBILITY · HIGH AVAILABILITY FOR SERVICE



MAXIMUM ACCESSIBILITY

The maximum accessibility provided in E-M-C Diesel Switchers makes possible—

- Quick inspection, adjustment and replacement of working parts.
- Low operating, maintenance and service costs.
- Maximum availability for service.

E-M-C Diesel Switchers are available in 100-Ton, 600 H.P. and 125-Ton, 900 H.P.

ELECTRO-MOTIVE CORPORATION
SUBSIDIARY OF GENERAL MOTORS
LA GRANGE, ILLINOIS, U. S. A.

E-M

E-M-C DIESEL POWER

BOXPOK
Driving Wheel Centers

For 55 Locomotives
Now On Order

BOXPOK CENTERS ON ALL DRIVERS

Northern Pacific...12—4-6-6-4's
Union Pacific.....15—4-6-6-4's
Southern Pacific...12—4-8-8-2's
Southern Pacific... 6—4-8-4's
New Haven .....10—4-6-4's

●

A significant fact showing beyond question that the many advantages of the BOXPOK driving wheel are being generally recognized by the railroads.

PREVENTS OUT-OF-ROUND WHEELS and flat spots by much stronger rim construction thus increasing tire mileage and reducing wheel maintenance.

HIGHER LOCOMOTIVE SPEEDS with reduced track stresses are now possible thru improved counter-balance and cross-balance.

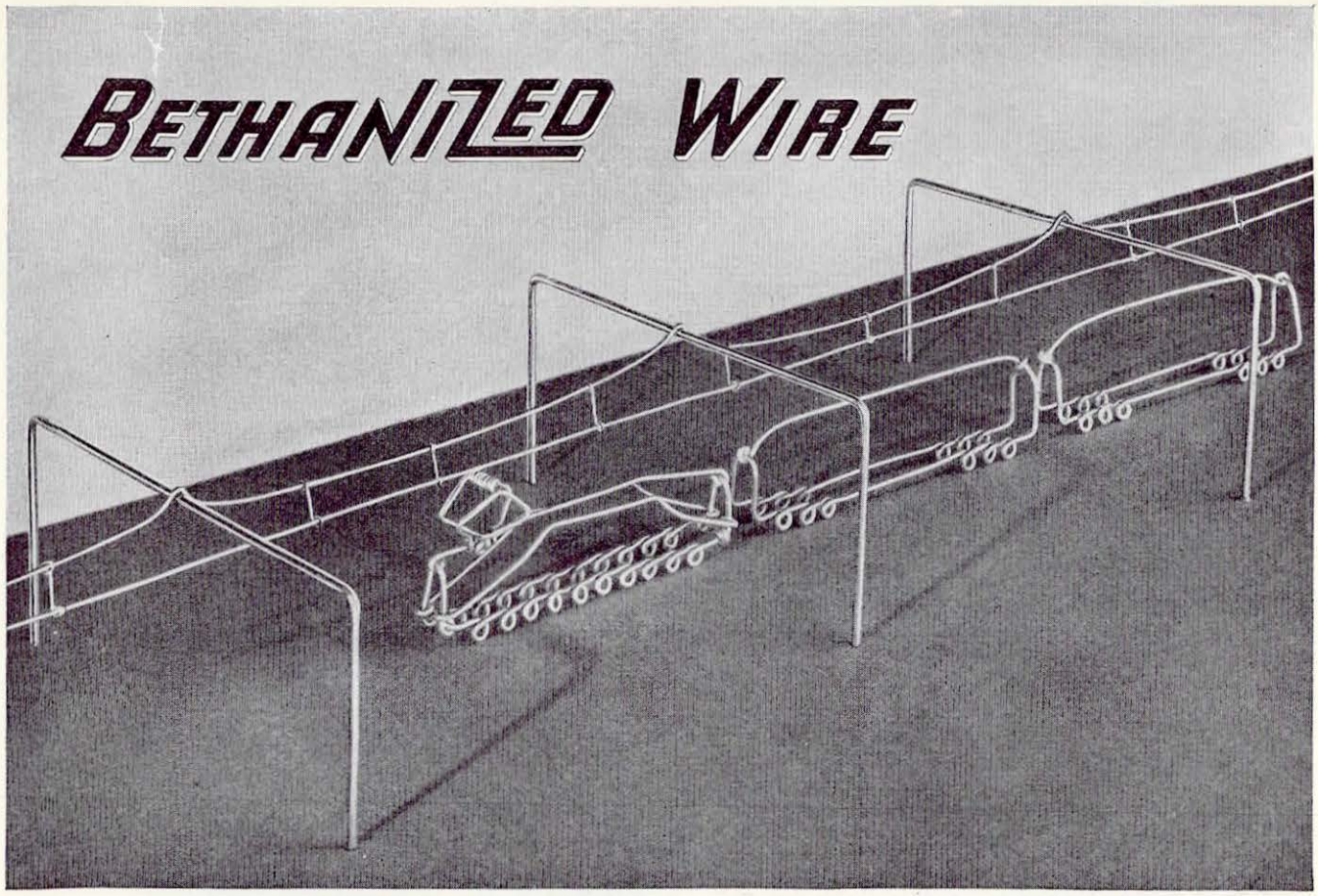
GREATER STRENGTH — Improved appearance — No increase in weight—More uniform sections.

ACCESSIBILITY for inspection and lubrication by openings in Wheel Centers.

GENERAL STEEL CASTINGS

EDDYSTONE, PA. GRANITE CITY, ILL.

Published weekly by Simmons-Boardman Publishing Company, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.



Wiregraph by Alexander Calder made of bethanized wire

For Strand, Bond Wire and other Railway Uses

RAILWAY maintenance engineers are now specifying bethanized wire both to obtain longer service under normal conditions of exposure and to combat abnormally severe corrosive conditions.

In partially electrified systems bethanized wire is now being specified in place of more expensive alloys for strand exposed to smoke from coal-burning locomotives passing directly beneath. As bond wire it meets the severely corrosive conditions caused by cinders.

The superior, longer-lasting zinc coating that protects bethanized wire is applied electrolytically, directly from a zinc ore concentrate. So different is it from coatings applied by older processes of hot-dip galvanizing that it is like a new metal. One feature is its high purity. The bethanized coating is actually 99.99 per cent pure. This high purity makes it exceptionally resistant to the acids generated from the sulphur content in coal and the sulphur gases present in some degree in the atmosphere everywhere. These acids formed from sulphur readily attack less pure galvanizing.

Equally advantageous is the exceptional ductility of the bethanized coating, the tightness with which it is bonded to the wire, and the exceptional latitude in coating weights that these properties permit. Bethanized wire brings economies as strand, bond wire, telegraph wire, semaphore and signal wire. And bethanized fence brings great savings in right-of-way protection. You can get bethanized wire for railway services in the usual coating weights specified for the purposes that zinc-coated wire serves—but with a better coating—at no greater cost than for other galvanized wire. Or, at slight additional cost, you can obtain bethanized wire in any weight of coating desired.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *District Offices:* Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

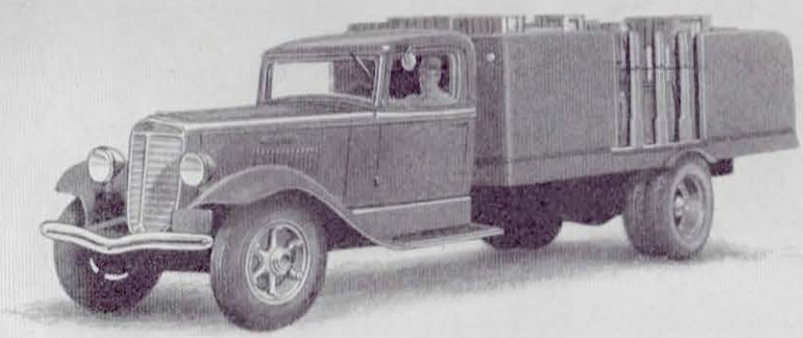
BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Another Example of the FLEXIBILITY in the

INTERNATIONAL TRUCK *Line*

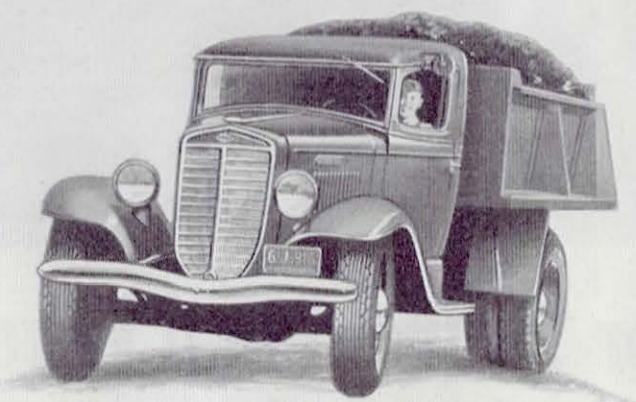
Here are 3 Popular Models, basically the same—but VERY DIFFERENT!



This is International Model C-35, a quality truck of 1½ to 2-ton rating with a max. carrying capacity of 8,350 lb. (cab, body, payload, and equipment)—International-built throughout—the ideal unit for a thousand-and-one hauling requirements.

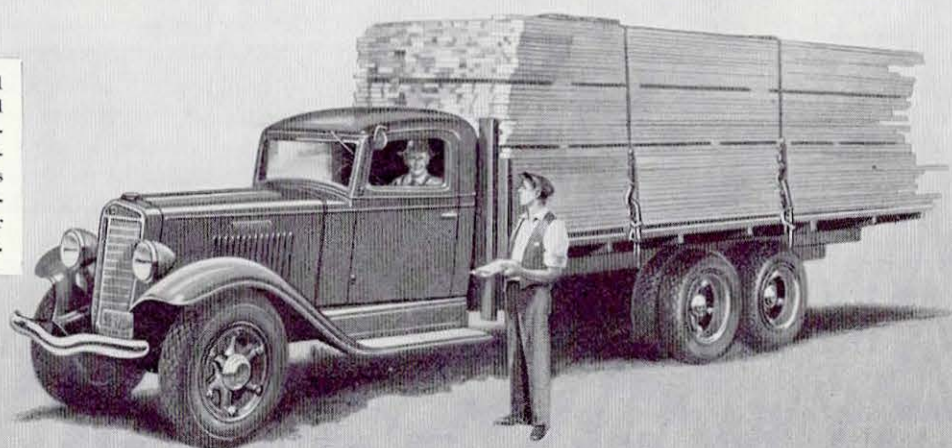
This is just one example of International Truck FLEXIBILITY—the full line offers a wide range of choice to make full efficiency on any job—on YOUR particular job, whatever it is. Remember that there are 28 International models—sizes Half-Ton to biggest Six-Wheelers—in 83 wheelbase lengths. Chassis prices from $415 up, f.o.b. factory. Low time-payment rates apply on all models. International branches and dealers are always at the service of truck users. They will be glad to advise you.

INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. (INCORPORATED) Chicago, Illinois



This is International Model CS-35, same rating and capacity, but engineered throughout for hardier service. This model has an International in-built 2-speed rear axle, doubling the transmission range, providing 8 forward and 2 reverse speeds for dual efficiency on hard highway and in roadless going. Here is POWER when you need it—SPEED when you want it.

And this is International Model CS-35-T, a perfected six-wheel truck — International-built — *with a greatly increased carrying capacity.* If you want this trailing-axle six-wheeler without the 2-speed axle, ask for International Model C-35-T.



INTERNATIONAL TRUCKS

FLAME-CUT FROM A *single* ROLLED STEEL SLAB

NINE TEST SPECIMENS FROM THIS FRAME SHOWED THESE HIGH STRENGTHS

These test results came from one of eight Carnegie-Illinois Rolled Steel Side Frames used on four 2-8-4 Lima Locomotives recently delivered to the Detroit, Toledo, and Ironton. Compare these high strengths and the satisfactory range of maximum-minimum values with comparable results from other types of side frames:

Yield point 45,180-40,540 lb./in.²
Ultimate strength 79,940-71,800 lb./in.²
Elongation 29.5-32.0%
Reduction in area 53.3-56.0%

This new locomotive side frame is stronger, more shock-resistant

NO blow-holes. No gas pockets. No internal stresses. No uncertain physical properties . . . None of these potential sources of failure are present in a Carnegie-Illinois Locomotive Side Frame. This new rolled steel side frame is one of the most important recent advances in locomotive design.

Superior quality open hearth or electric furnace steel goes into this basic part. After the slab is rolled to proper dimensions, it is annealed and tempered. The resulting metal is unusually dense, highly homogeneous.

From this tempered slab, an oxy-acetylene flame cuts an outline of the frame, leaving less than an inch of metal to be removed by final machining. The entire process is simple, direct, easily controlled . . . especially so when compared with other methods of construction.

Even after the frame is cut, nine test specimens from vital areas are examined to make certain that physical and metallurgical properties are correct. Metallurgical control, rigid inspection leave nothing to chance.

Find out how little this new, better construction will cost. Send us your blue print and we shall be glad to give you a prompt estimate.

CARNEGIE-ILLINOIS LOCOMOTIVE SIDE FRAMES

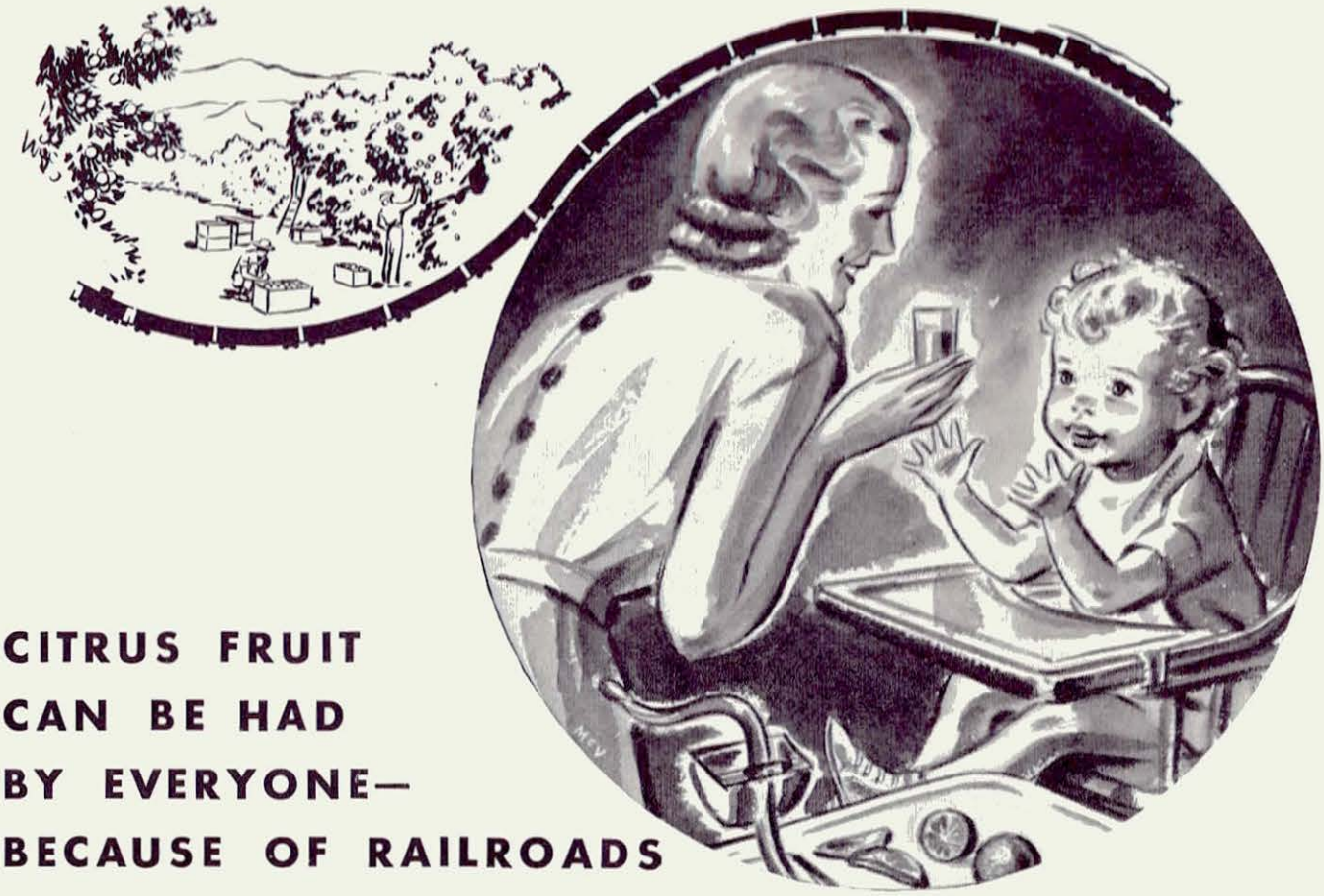
CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh *Chicago*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



CITRUS FRUIT CAN BE HAD BY EVERYONE— BECAUSE OF RAILROADS

● Children will stay alive on mush and milk if you can get them to swallow it three times a day. But mothers know that a balanced diet gives better nourishment, fills out tiny muscles, makes bones strong.

This modern knowledge would be useless if the railroads did not make it possible for every food producing region to economically ship its products to every U. S. family. Citrus fruit is only one example. With the development by the railroads of efficient refrigerator car service they made simple the problem of putting orange juice on baby's daily breakfast menu.

American Hair & Felt Company and Dry-Zero Corporation assisted in perfecting the refrigerator car by developing the most efficient types of insulation. Railroad car engineers have recognized this efficiency and cooperation by specifying the insulation products of these affiliated companies for almost all refrigerator cars now in service.

HAIRINSUL — Standard refrigerator car insulation.

DRY-ZERO — The most efficient and lightest weight low temperature insulation known —standard for low temperature cars.

SALAMANDER — For over 30 years the standard insulation for passenger cars.

LIGHT-WEIGHT SALAMANDER — For insulating light-weight, high speed passenger cars.

CARINSUL — Made especially for insulating the letter board of passenger cars.

OZITE STANDARD HAIR FELT — Made by the genuine original platen or felted process and universally recognized as the highest standard of felted insulation.

LIGHT-WEIGHT AIR CONDITIONING HAIR FELT — For insulating air ducts.

DRY-ZERO ECONOMY ICE BLANKET —For reducing ice meltage on platforms and in transit.

AMERICAN HAIR & FELT COMPANY • DRY-ZERO CORPORATION
(Railroad Division)
Merchandise Mart Chicago

25 Years "workin' on the railroad" proves

NATIONAL COPPER-STEEL PIPE

Lasts 2 to 3 times longer

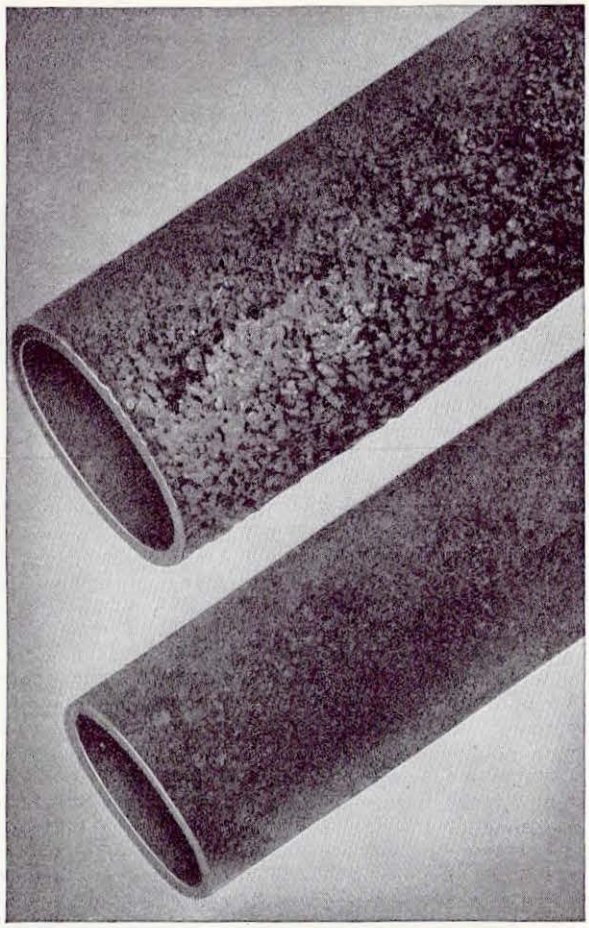
. . . BECAUSE IT RESISTS ATMOSPHERIC CORROSION

RAILROAD men know all too well the annual toll they pay to the ravages of corrosion. For rust is a natural enemy of railroad equipment. On car and locomotive piping, alternate wetting and drying take place constantly. The metal rusts. The pipe weakens. Replacement is necessary. Another costly, unnecessary item goes on the maintenance sheet.

Rust-resisting NATIONAL Copper-Steel Pipe provides a simple, effective and economical protection against this expense. It costs only a little more than ordinary pipe. It lasts two to three times longer. The many years extra life it assures is a fact, demonstrated by thousands of actual on-the-job tests and installations in locomotive and train lines on leading roads.

Use NATIONAL Copper-Steel Pipe wherever atmospheric corrosion exists, where other pipe is short-lived. Its durability is unsurpassed by any ferrous material within a justifiable price range.

And don't overlook this important advantage — NATIONAL Copper-Steel Pipe in addition to its unusual corrosion resistance has the strength, uniformity and ductility for which *all* NATIONAL Pipe is noted. It not only lasts long—it installs easily.



NON-COPPER PIPE

showing effect of atmospheric corrosion (after seven years) in moist mill atmosphere.

COPPER-BEARING PIPE

Showing little or no effect after years of service in the same corrosive atmosphere.

LOOK FOR THE GREEN COLOR!

National Copper-Steel Pipe is marked as follows: Black Pipe—Smaller sizes colored green. Larger sizes, two green stripes running lengthwise. Galvanized Pipe—All sizes, two green stripes running lengthwise.

NATIONAL TUBE COMPANY

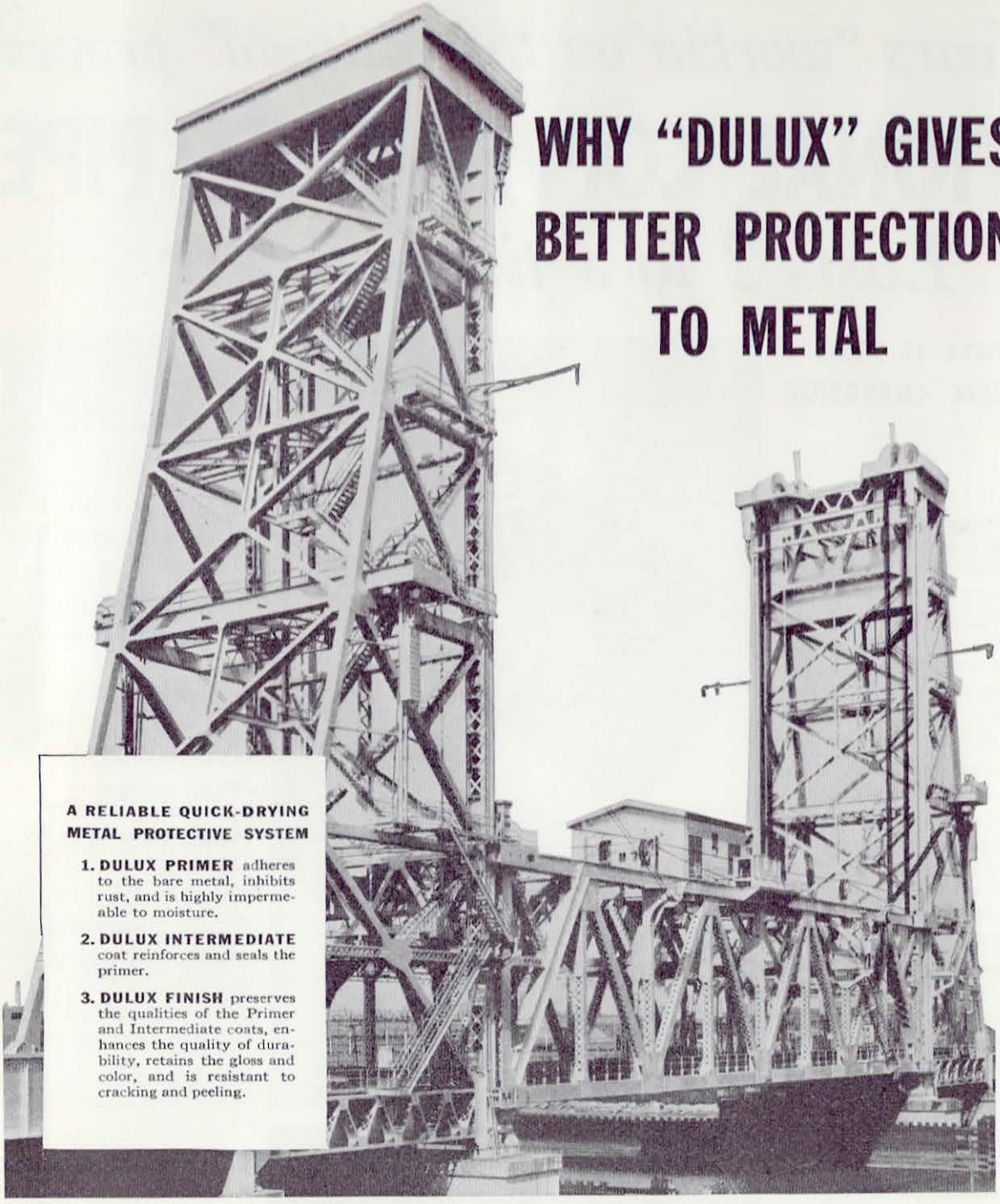
PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

WHY "DULUX" GIVES BETTER PROTECTION TO METAL

MEASURE YOUR PAINT COST BY THE *performance yardstick*—



A RELIABLE QUICK-DRYING METAL PROTECTIVE SYSTEM

1. **DULUX PRIMER** adheres to the bare metal, inhibits rust, and is highly impermeable to moisture.
2. **DULUX INTERMEDIATE** coat reinforces and seals the primer.
3. **DULUX FINISH** preserves the qualities of the Primer and Intermediate coats, enhances the quality of durability, retains the gloss and color, and is resistant to cracking and peeling.

RESEARCH has convinced us that much of the damage to metal protective paint films takes place during the initial painting. If moisture reaches the freshly painted surface before it has set, the film is weakened and early failure is apt to result.

The fast-drying properties of DULUX primers and intermediate coats make them quickly impermeable to moisture. Thus the DULUX film gives maximum protection from the start. Its extraordinary toughness and resistance to mechanical injury make it superior to ordinary finishes. The DULUX system lasts much longer and is resistant to checking and cracking, so damage from rust and corrosion is reduced to a minimum.

All of these advantages make the DULUX Metal Protective System the ideal finish for the prevention of corrosion, the arch-enemy of steel; the ideal finish for preservation of bridges and other metal structures which are exposed to the most severe weather conditions. It has been designed expressly for this purpose and consists of a complete line of primers, intermediate, and finishing coat materials.

Many railroads have lowered their finishing and maintenance costs by using DULUX. Ask our representative how you, too, can enjoy similar savings. E. I. du Pont de Nemours & Co., Inc., Finishes Division, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

RAILWAY FINISHES

Cost of Rebuilding-High Life Expectancy-Low

IN the section dealing with the economics of rebuilding old equipment, Coverdale & Colpitts make the following statements in their report on the "Economic Aspects of the Freight Car Situation".

"Studies that have been made of heavy repair and rebuilding costs show that rebuilding programs in the past generally have been uneconomical . . . A summary of the facts developed in our 1934 report with respect to car rebuilding programs follows.

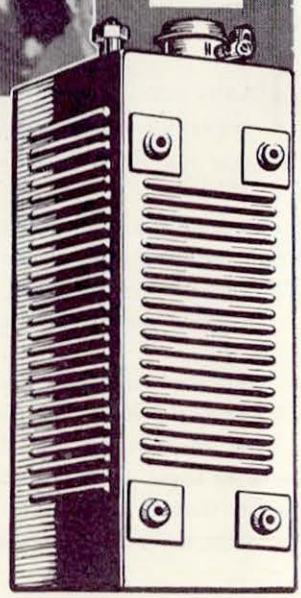
"Data were obtained for 35,358 cars, most of which were rebuilt between 1923 and 1929. Four railroads rebuilt box cars having an average age of 16.8 years at the time of rebuilding. The average addition to the useful life of these cars accomplished by the rebuilding was 9 years. Rebuilding costs ranged from a low of $1,200 on one railroad to a high of $1,689 on another railroad, the average for five railroads being $1,487."

Car building companies would welcome the opportunity to present to any railroad analysis to prove the economy of replacing old equipment with new. It will show a real saving for the railways.

American Railway Car Institute

19 Rector Street New York, N. Y.

SUBWAYS ARE ALKALINE

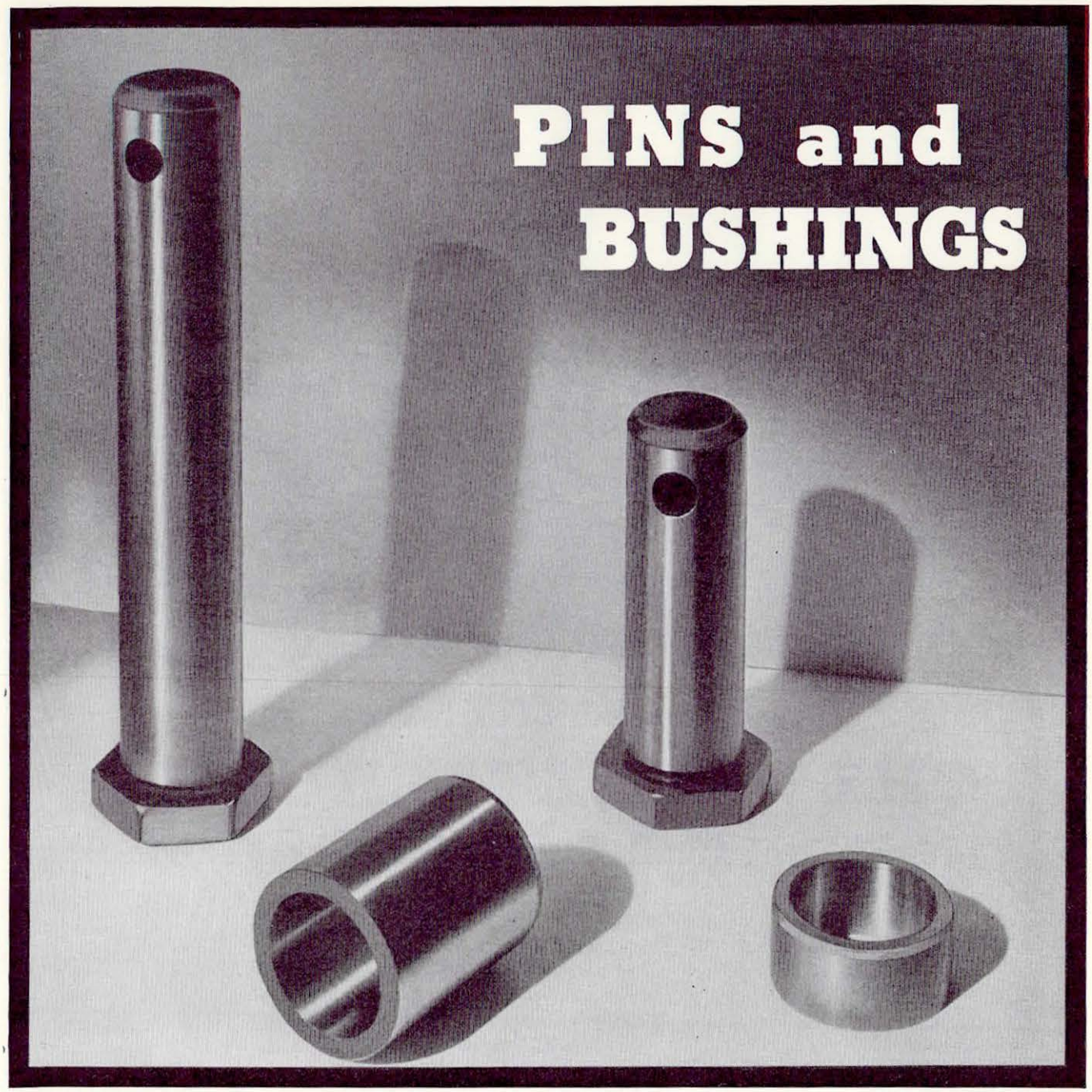


● New York's thundering subways depend on alkaline batteries to safeguard the very lives of passengers! Black darkness hovers close in these underground tubes . . . panic can start at the very first sign of trouble. Doors must jump open at a touch, safety lights must glow steadily and light instantly, brakes and controls must be faultless. In short, power must be protected. The subways have chosen Edison Steel-Alkaline Batteries for reliable power.

This battery subways choose for passenger safety, has been found the most trustworthy for railroad air-conditioning and car lighting. Supposing the car temperature climbs to 95. Passengers expecting comfort grumble unfairly about the service. Battery failure can do it! Edison Steel-Alkaline Batteries are not subject to unexpected failure. Their superiority is unchallenged. Since their over-all cost is least per year it is not even economical to provide patrons with less than the most dependable comfort.

EDISON STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, NEW JERSEY



For all wearing positions on railway passenger equipment and locomotives, American Steel Foundries case hardened and ground pins and bushings, finished to close tolerances, are manufactured in a great variety of shapes and sizes.

They are held to a uniform depth and hardness of case and a refined ductile core structure of maximum strength.

They surpass all ordinary commercial demands for exceptionally fine finish.

The use of American Steel Foundries pins and bushings in all wearing positions is a safeguard against high maintenance costs.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Low-Priced . . . High-Powered

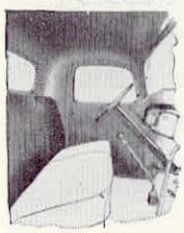
CHEVROLET TRUCKS

The Most Economical Trucks for Transfer Haulage

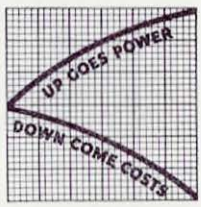
NEW PERFECTED HYDRAULIC BRAKES

always equalized for quick, unswerving, "straight line" stops

NEW FULL-TRIMMED DE LUXE CAB



with clear-vision instrument panel for safe control



Railways everywhere are buying low-priced, high-powered Chevrolet trucks as the equipment best suited for their terminal haulage needs. Here are four good reasons why:

FIRST: New Chevrolet trucks have the greatest *pulling power* of any trucks in the low-price range . . . plenty of power for the heavier loads.

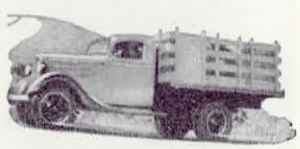
SECOND: Chevrolet's High-Compression Valve-in-Head Engine is not only very powerful but more economical . . . it uses less gas and less oil.

THIRD: Features like Chevrolet's New Perfected Hydraulic Brakes, massive Full-Floating Rear Axle and rugged 4-Speed Transmission assure owners of long-lived, dependable service with lowest maintenance expense.

FOURTH: The first cost is notably low—and that means less depreciation and a better investment.

Convince yourself of the great power and economy of Chevrolet trucks with a demonstration on your own haulage jobs. Your Chevrolet dealer will gladly arrange such a test.

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN



NEW HIGH-COMPRESSION VALVE-IN-HEAD ENGINE

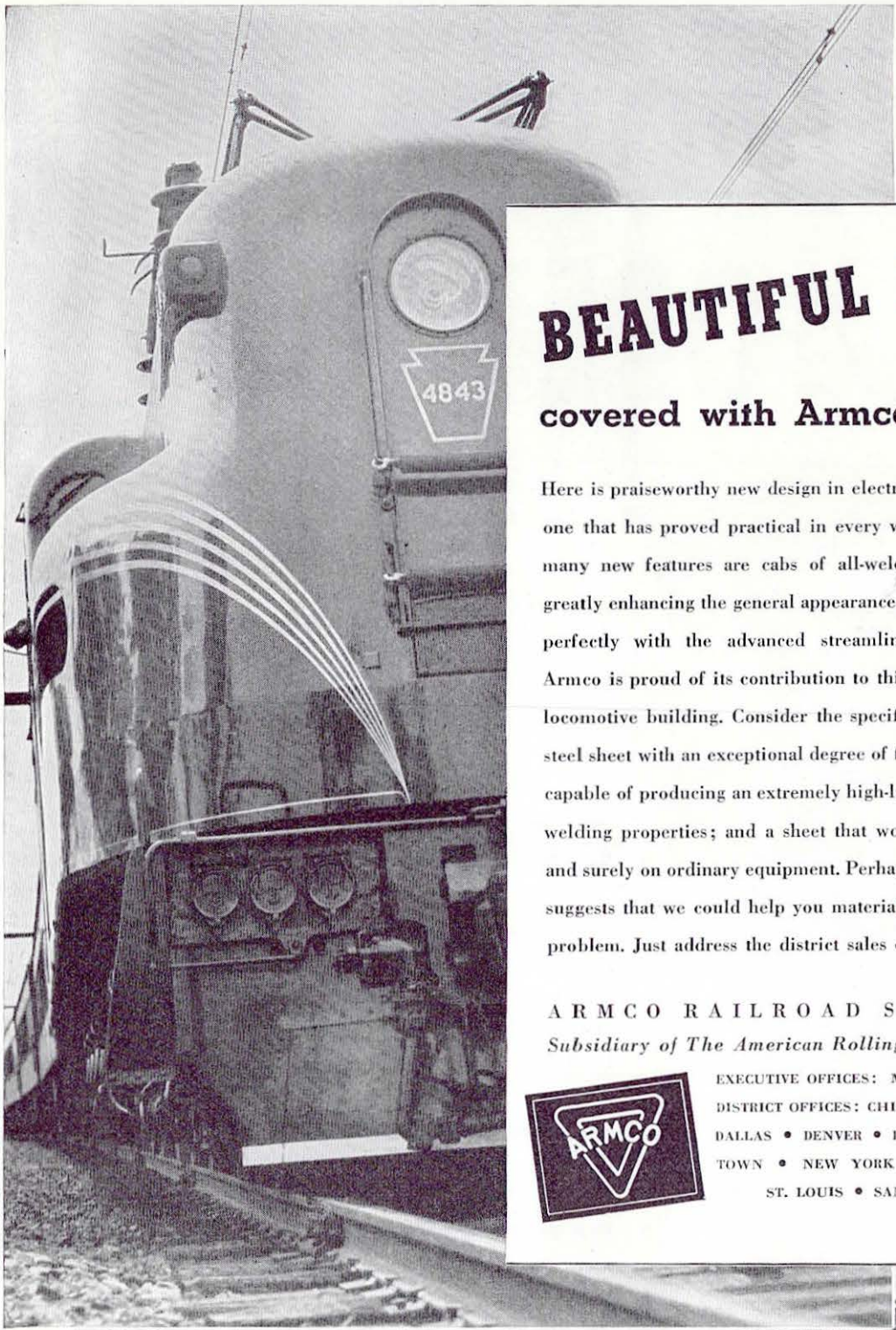
with increased horsepower, increased torque, greater economy in gas and oil

FULL-FLOATING REAR AXLE

with barrel type wheel bearings on 1½-ton models

FOR ECONOMICAL CHEVROLET TRANSPORTATION

GENERAL MOTORS INSTALLMENT PLAN—MONTHLY PAYMENTS TO SUIT YOUR PURSE



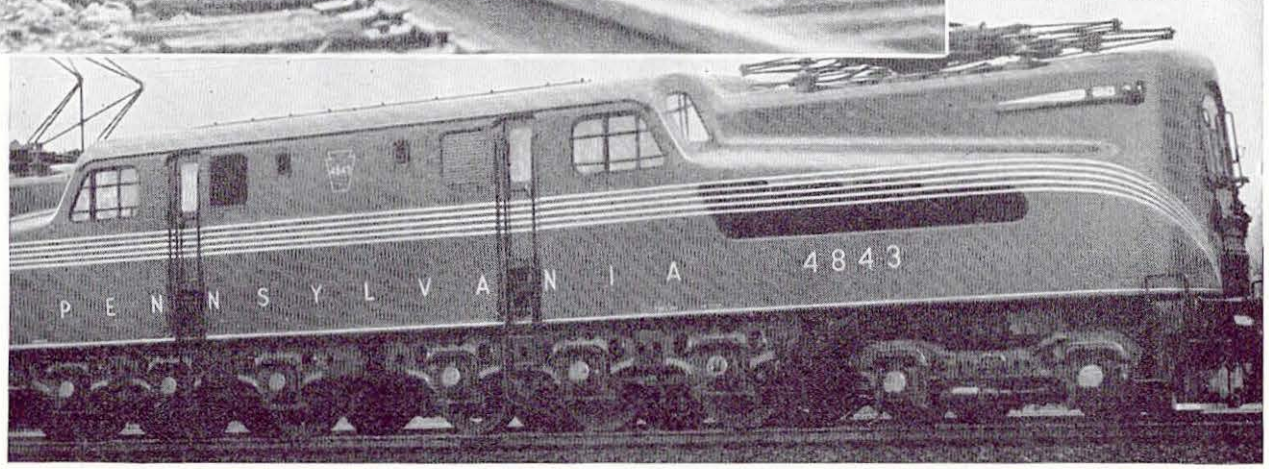
BEAUTIFUL JOBS

covered with Armco Sheets

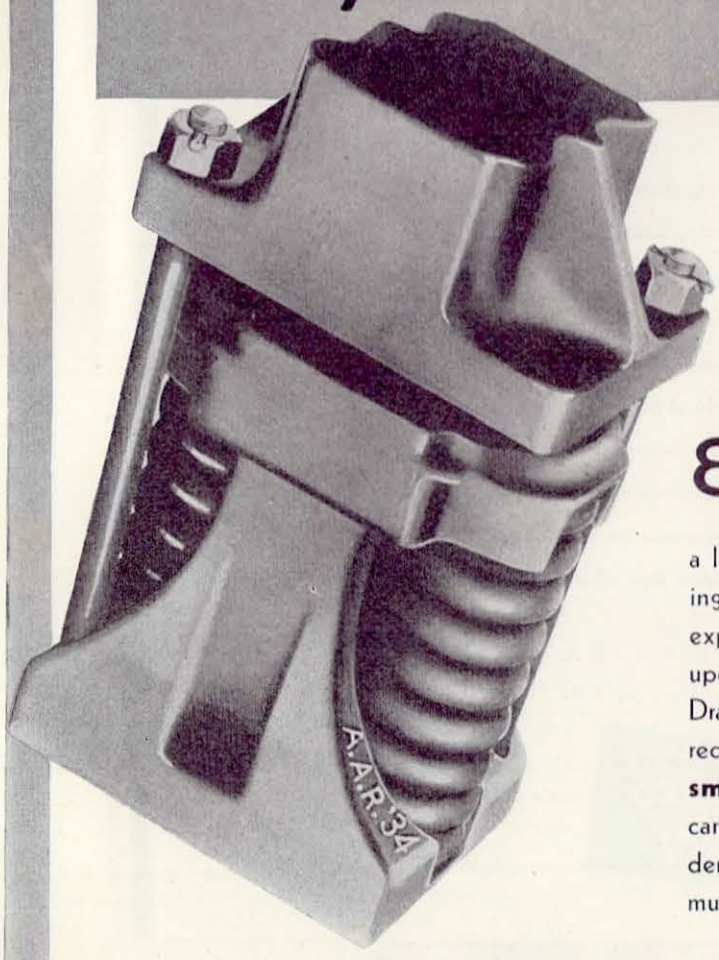
Here is praiseworthy new design in electric locomotives—one that has proved practical in every way. Among their many new features are cabs of all-welded construction, greatly enhancing the general appearance and harmonizing perfectly with the advanced streamlined construction. Armco is proud of its contribution to this achievement in locomotive building. Consider the specifications: A large steel sheet with an exceptional degree of flatness; a surface capable of producing an extremely high-lustre finish; good welding properties; and a sheet that would form readily and surely on ordinary equipment. Perhaps this experience suggests that we could help you materially with a similar problem. Just address the district sales office nearest you.

ARMCO RAILROAD SALES CO.
Subsidiary of The American Rolling Mill Company

EXECUTIVE OFFICES: MIDDLETOWN, OHIO
DISTRICT OFFICES: CHICAGO • CLEVELAND
DALLAS • DENVER • DETROIT • MIDDLETOWN • NEW YORK • PHILADELPHIA
ST. LOUIS • SAN FRANCISCO



More PROFITABLE Freight OPERATION



80% of railway operating revenues is derived from freight. National Draft-Gear Economies will convert a larger percentage of gross revenue into net operating income by reducing maintenance of equipment expenses. Car maintenance is definitely dependent upon draft gear performance. The National M-17-A Draft Gear ranks high in *ALL* vital and necessary requisites — **capacity, sturdiness, endurance, smoothness and uniformity.** On thousands of cars this time-tested, service-proved draft gear has demonstrated an unequalled ability to provide maximum protection to cars and lading.

NATIONAL
Type M-17-A
DRAFT GEAR
A.A.R. Approved

NATIONAL
NACO STEEL
DRAFT GEARS

NATIONAL MALLEABLE AND STEEL CASTINGS CO.

General Offices: CLEVELAND, OHIO

Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco

Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

THE "LIFT" IN COOL, CLEAN AIR

. . . is reflected in passenger revenue

PASSENGER-CAR air-conditioning has proved its value to travelers and to railroads alike. But be sure your air-conditioning equipment can deliver real comfort throughout the hottest day—for then is when it's needed most. And be sure it operates with economy, so the increased traffic attracted produces the expected revenue.

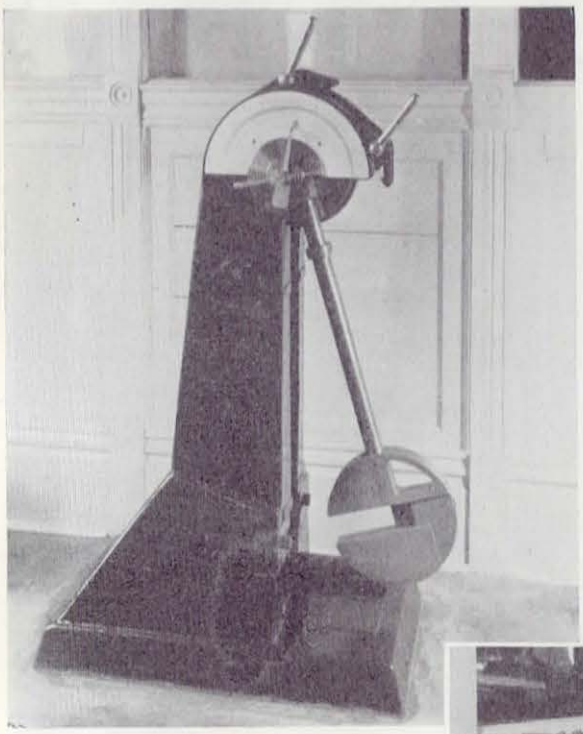
It is easy to be sure of both, for it has been shown by wide experience that Exide-Ironclad Batteries improve air-conditioning service and cut costs.

These batteries, with their tremendous reserve power can handle with ease the prolonged heavy loads imposed by summer weather. High electrical efficiency enables them to make the most of the current charged into them. Dependability, extremely low maintenance costs and long life are assurance to you that Exide-Ironclads will keep your air-conditioning service economical.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

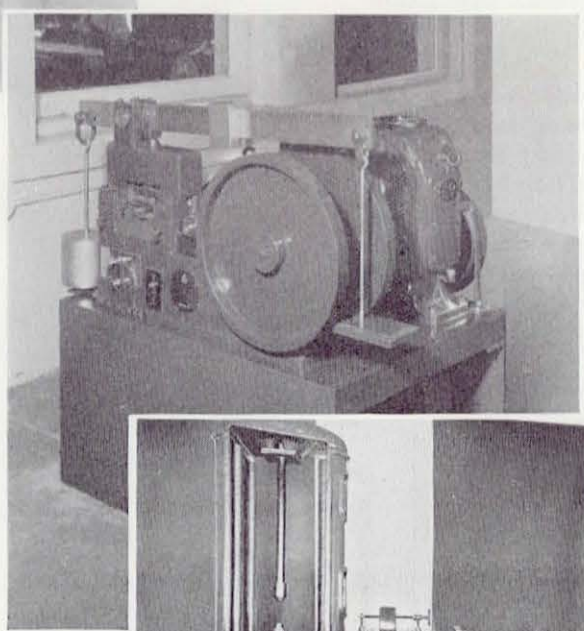
Exide
IRONCLAD
BATTERIES
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.

METALLURGY AND THE CHILLED CAR WHEEL



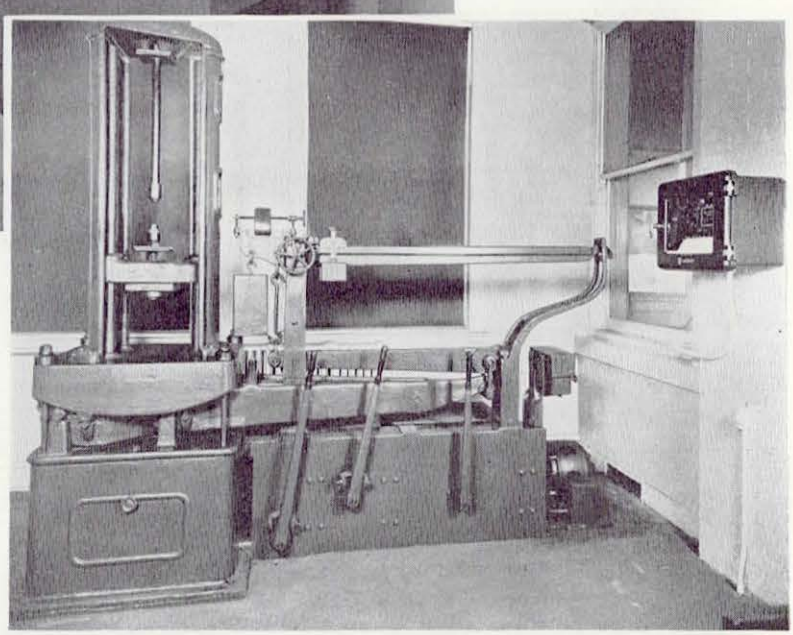
Charpy, Izod and Tension Tests are made on this Precision Universal Impact Testing Machine.

BOTH for research, and as an accurate aid in manufacturing control, the laboratory is equipped with testing machines which are capable of measuring all of the important physical properties of the metal in Chilled Car Wheels. These tests enable the staff to improve and maintain the high metallurgical standards which continue to insure the excellent service performance of Chilled Car Wheels.



The Wearing Qualities of a Chilled Car Wheel are Determined on this machine

A 100,000-lb. three-screw Testing Machine used for Testing Specimens Prepared from the Electric Furnace Melts.



MEMBERS

Albany Car Wheel Co.
American Car & Fdry. Co.
Bass Fdry. & Machine Co.
Canada Iron Foundries, Ltd.
Canadian Car & Fdry. Co.
Central Car Wheel Co.
Cleveland Production Co.
Dominion Wheel & Fdries., Ltd.
Griffin Wheel Co.
Hannibal Car Wheel & Fdry. Co.
Lobdell Car Wheel Co.
Louisville Car Wheel & Ry. Sup. Co.
Marshall Car Wheel & Fdry. Co.
Maryland Car Wheel Co.
Mt. Vernon Car Mfg. Co.
New York Car Wheel Co.
Pullman-Standard Car Mfg. Co.
Ramapo Fdry. & Wheel Works
Reading Car Wheel Co.
Southern Wheel Co.
Tredegar Iron Works

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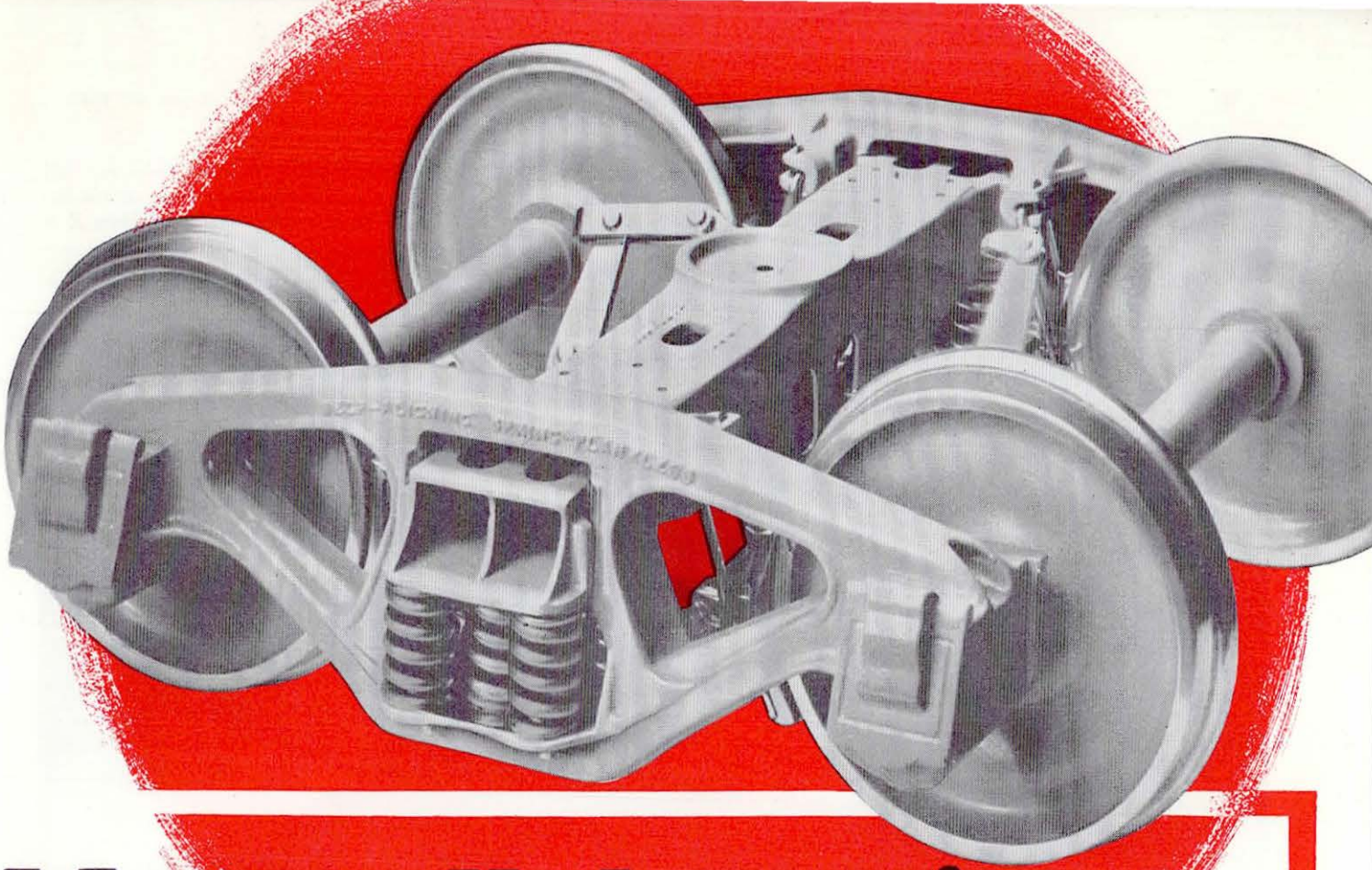

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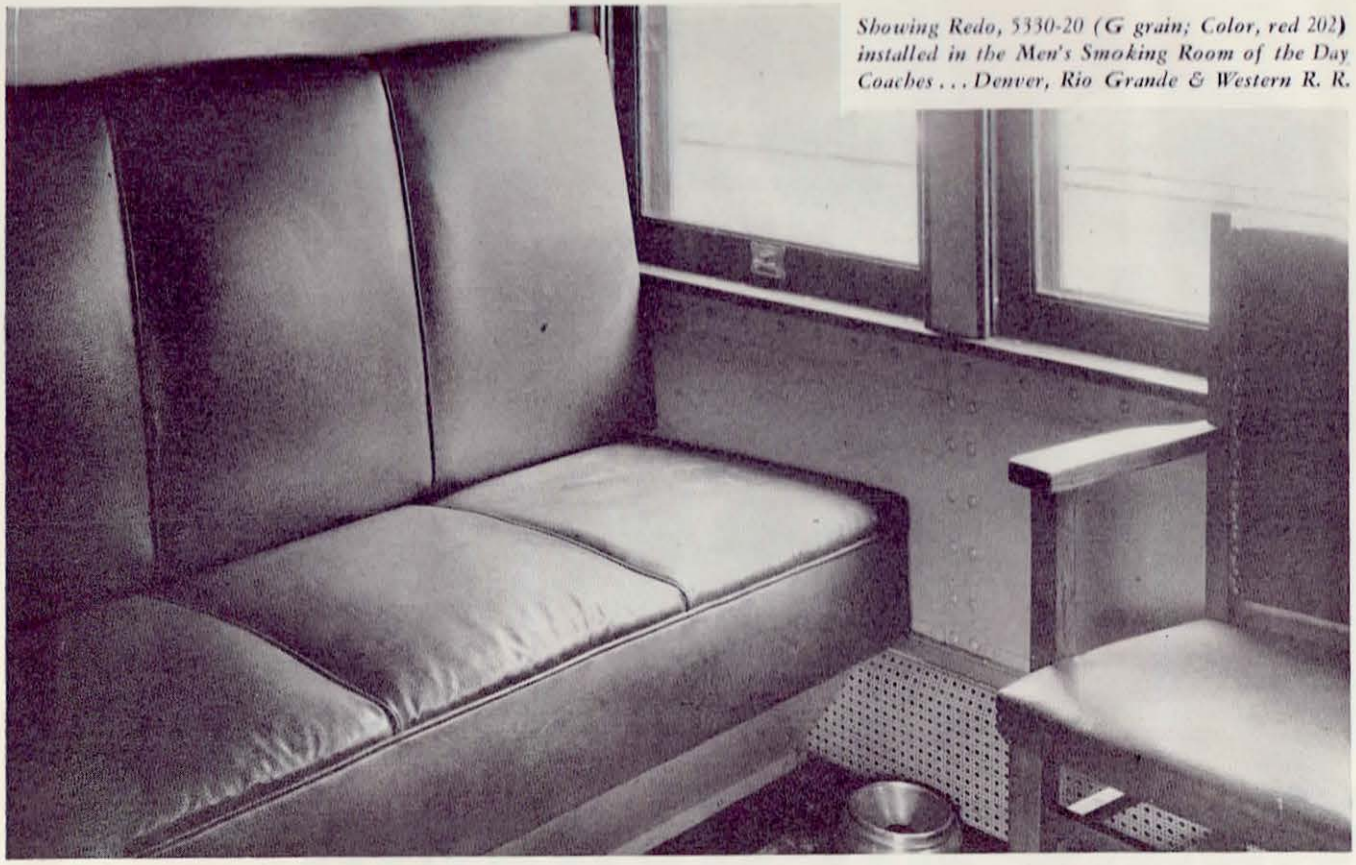

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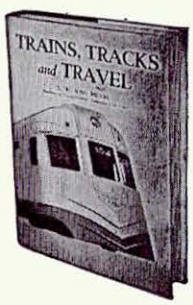

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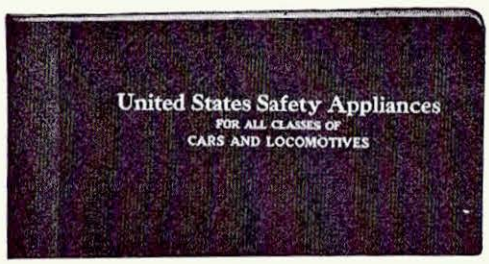

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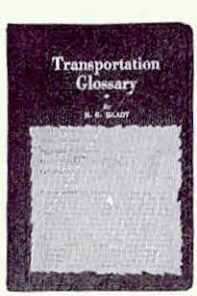

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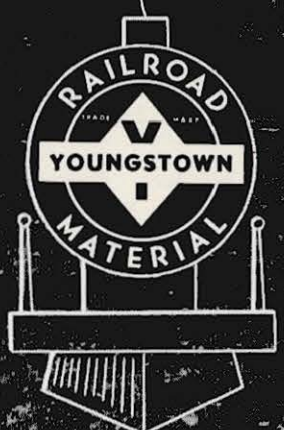

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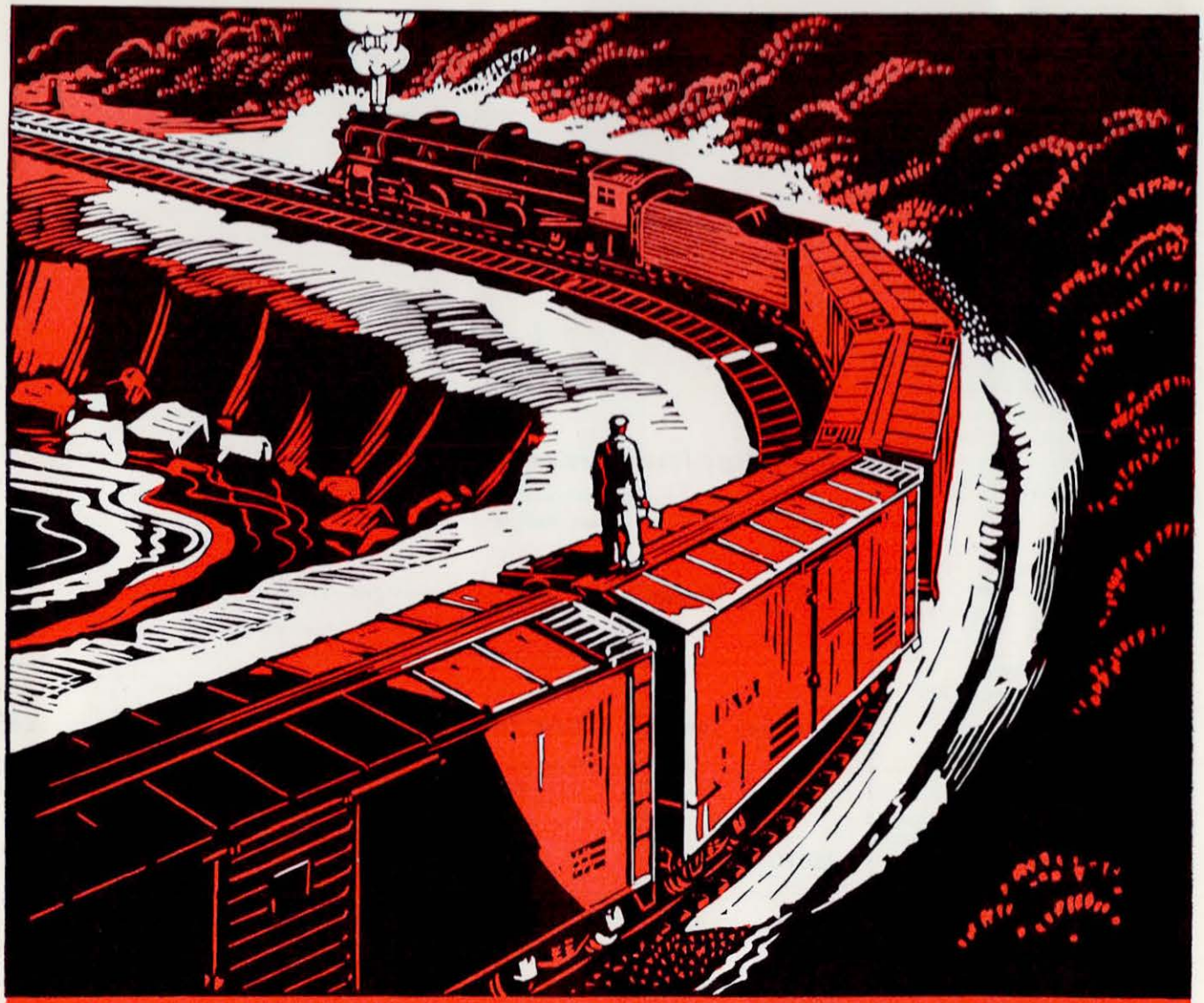

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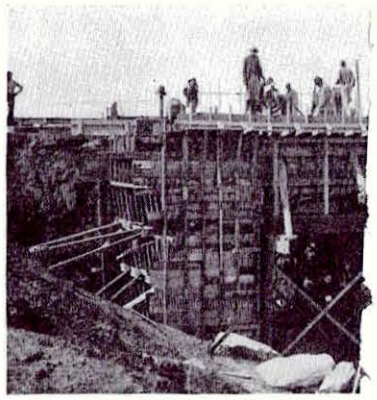

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Public Relations Work and the State Governments

For five years, more or less, there have been functioning in possibly half the states organizations of employees and citizens interested in railway welfare, known variously as railroad employees' and citizens' leagues or "ship-by-rail" clubs. These organizations, the purpose of which has been directly to encourage patronage of railway services, and indirectly to aid the railways by supporting legislation designed to equalize transport competition, have in some states been remarkably successful in attaining their objectives. Elsewhere they have accomplished little or nothing. Anyone who has followed the activities of these organizations closely knows why the successful ones have succeeded and why the unsuccessful ones have failed.

Legislative Spokesmen Need Constituents

Success or failure has in nearly every case been closely associated with, and dependent upon, the methods and the effectiveness with which railways in the various states have presented their case to the public. Where the approach has been direct and forthright, the co-operation of employees and citizens has been welcomed, and organizations mobilizing these forces have, where they have existed, thrived. Where the railroad approach has been confined to the activities of legislative attorneys, some of whom appear to be more concerned with maintaining a monopoly of spokesmanship for the railroads than with securing effective action in behalf of the carriers, the good will and aid of employees and citizens, freely offered, have not been utilized. There are, of course, many states in which there are no "ship-by-rail" or employees' and citizens' leagues, in which employee and public support for fair treatment of the railroads has been effectively mobilized in some other manner. The fact remains, nevertheless, that in a number of states the responsible railway representatives have welcomed the freely offered co-operation of these organizations and have thereby secured public support and favorable action, while elsewhere such assistance has not been welcomed and in many such cases little or nothing has been accomplished in securing legislation to which there was any considerable opposition.

There are, in general, two methods by which the railways can present their case to the public and the state legislature and administrative authorities. One is through relying exclusively on legislative specialists who know their way around the state capitols and the procedural technique by which legislative and administrative action is achieved. The second method fully recognizes the importance of these specialists and utilizes their services, but also attempts to mobilize and vocalize an intelligent public opinion. The legislative specialist functioning alone is frequently able to do effective work, but usually *he can do little or nothing where any opposition with votes to support it exists.* Legislators and administrators may desire to accede to his reasonable requests, but they cannot do so and stay in office if there is an opposition with a voting constituency behind it, and the railroad representative has none behind him.

Railway Rivals Have Votes

The fact is that there *is* in every state a voting constituency which supports all manner of favoritism for railway competitors, and in the face of such opposition no legislative spokesman for the railways can hope to accomplish very much toward getting a square deal for the railroads—despite the good wishes of legislators and administrators—unless he too has a constituency to back him up. Railroad legislative spokesmen who do not recognize this obvious fact and act accordingly are living in a bygone day when the railways had no competitors with votes to use against railway welfare.

To be sure, the mobilization of railway employees and citizens in support of railway patronage and equality of taxation and regulation of competing forms of transportation has its dangers. Any force whatever which is improperly and ignorantly directed is dangerous.

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I.C.C. Studies Light-Weight Passenger Trains

Statement of the Bureau of Statistics presents unit comparisons of weight, first cost and costs of operation

THE Bureau of Statistics of the Interstate Commerce Commission has recently issued a statement in which are presented the results of a comprehensive survey of the various new types of light-weight passenger trains. This statement, No. 3639, contains a condensed description of the trains, setting forth the principal materials of construction and the types of motive power by which they are hauled. Its value, however, lies in the unit comparisons of the new trains classified by types of motive power and between the new trains and conventional passenger equipment. The comparisons include weight, first cost, and operating and maintenance costs. The questions of speed, safety and comfort are also briefly considered.*

The data on which the statement is based were reported by the railroads in answer to a questionnaire issued on August 1, 1935, and cover the three months ended September 30, 1935. The facts thus secured were supplemented from the files of the Commission and in various technical articles in the *Railway Age*. An abstract of the statement follows.

General Description of the Trains

Eighteen new type light-weight passenger trains, all streamline, were operated by 11 Class I roads during the three months ended September 30, 1935. These trains can be divided into three groups: One composed of six trains, each consisting of seven or eight cars, four of which trains were hauled by steam locomotives, one by a Diesel-electric locomotive, and one by a Diesel-electric motor car; another group containing eight trains of three or four cars each powered by Diesel- or distillate-electric motor cars, and a third group consisting of gasoline-engine single-unit motor cars (or rail buses) which have been included in this study mainly for comparison with the multi-car trains. Table I gives the names of these trains, the roads operating them, where they are operated, and a description of their equipment.

The rated cylinder horsepower of the steam locomotives varied from 1,800 for each of the Hiawathas to 2,200 for the Royal Blue. The rated horsepower of the Diesel and distillate engines ranged from 600 horsepower for the Rebels, the Flying Yankee, and the Kansas Streamliner to 1,800 for the Royal Blue Diesel locomotive. The rail buses had horsepower of 176 each.

The rated tractive force of the steam locomotives varied from 30,700 lb. for each of the Hiawathas to 41,000 lb. (including booster) for the Royal Blue. The rated tractive force of the Diesel and distillate engines ranged from 18,000 lb. for each of the three Zephyrs to 50,400 lb. for the Royal Blue Diesel locomotive. The rail buses each had a rated tractive force of 4,930 lb.

The trains studied consist of various types of cars. The Hiawathas consist of four coaches, one dining car, and two parlor cars; the City of Portland of a power car, a baggage car, a diner-lounge car, three Pullman sleeping cars, and a buffet-coach; each of the Twin Zephyrs of a combination motor and baggage car, a combination coach and dinette and a combination coach and lounge car; and each of the Rebels of a combination motor, mail, and baggage car, a buffet coach, and a combination sleeping and observation car. The rail buses have a coach compartment and baggage compartment, with the motor under the floor.

Weight Comparisons

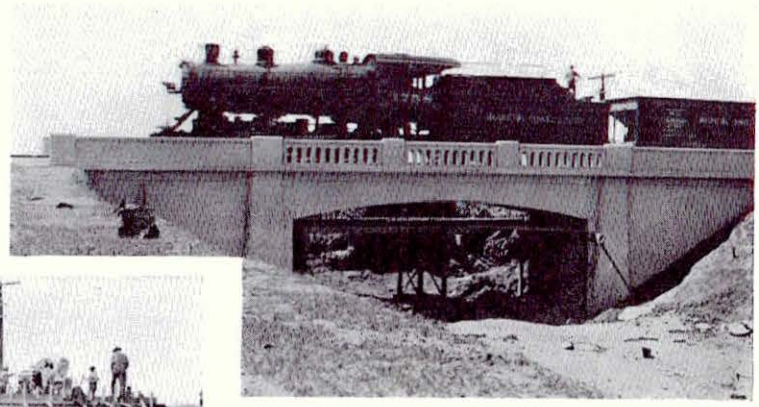
The average weight of steam locomotives which haul these light-weight trains may be compared with that of typical locomotives hauling high-speed passenger trains of conventional weight, such as the "Century," the "Broadway," and the Chicago & North Western "400," as in Table II. This indicates that the reduction in the weight on drivers was accompanied by a like decrease in rated tractive force. The reduction in the weight of the tender is due mainly to the reduction in capacity.

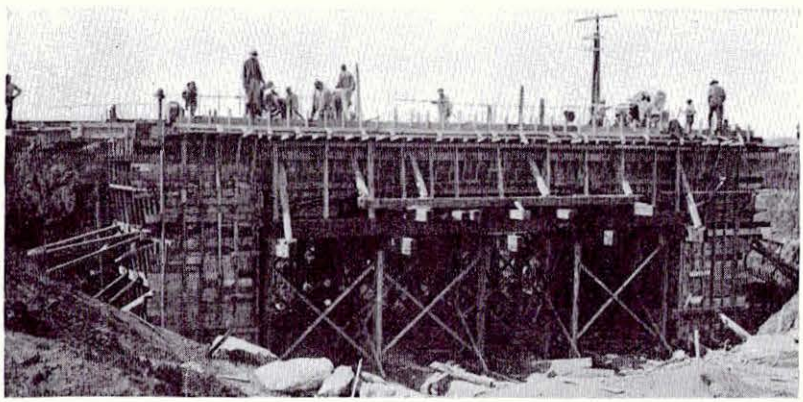
The all-welded steel cars of the Hiawathas, the Cor-Ten steel cars of the Abraham Lincoln, and the aluminum alloy cars of the Royal Blue, are 31 percent, 40 per cent, and 46 per cent lighter, respectively, than equivalent cars of conventional riveted steel construction. The figures indicate only approximately the differences in the weights of cars made of the various metals, because some aluminum was used in the construction of the Cor-Ten steel cars and some steel in the aluminum alloy cars. The shell weight of the Cor-

Table I—New Type Light-Weight Passenger Trains Included in This Study

Train and operating railroad	Where operated	Equipment
Hiawathas Nos. 100 and 101 (C. M. St. P. & P.)	Chicago-Twin Cities, Minn.	Steam locomotive 7 all-welded steel cars
Abraham Lincoln (Alton)	Chicago-St. Louis	Steam locomotive 8 Cor-Ten steel cars
Royal Blue (B. & O.)	New-York-Washington, D. C.	Steam locomotive 8 aluminum alloy cars
Royal Blue (B. & O.)	New York-Washington, D. C.	Diesel-electric locomotive 8 aluminum alloy cars
City of Portland (U. P.)	Chicago-Portland, Ore.	Diesel-electric motor car 7 aluminum alloy cars
Rebels Nos. 352 and 353 (G. M. & N.)	New Orleans-Jackson, Tenn.	Diesel-electric motor car 3 Cor-Ten steel cars
Comet (N. Y. N. H. & H.)	Boston-Providence, R. I.	2 Diesel-electric motor cars 3 aluminum alloy cars
Original Zephyr No. 9900 (C. B. & Q.)	Lincoln, Nebr.-Kansas City, Mo.	Diesel-electric motor car 4 stainless steel cars
Twin Zephyrs No. 9901 and 9902 (C. B. & Q.)	Chicago-Twin Cities, Minn.	Diesel-electric motor car 3 stainless steel cars
Flying Yankee (B. & M. and Maine Central)	Boston-Bangor, Me.	Diesel-electric motor car 3 stainless steel cars
Kansas Streamliner—M-10000 (U. P. R. R. Co.)	Kansas City, Mo.-Salina, Kans.	Distillate-electric motor car 3 aluminum alloy cars
Rail buses Nos. 101, 102, 103 and 104 (Nor. Sou.)	Norfolk-Virginia Beach, Va.; Washington, N. C.-Raleigh, N. C.; Beaufort, N. C.-Goldsborough, N. C.	1 Cor-Ten steel and aluminum motor car powered by a gasoline engine with mechanical drive

* The discussions of speed and comfort have been omitted from this abstract.—EDITOR.





Above—The Finished Structure (Grading for Highway Not Completed). At Left—A Construction View

Apply Rigid-Frame Design in Subway at Ringgold, Tex.

Studies of various types of construction demonstrate economy and adaptability of this form of concrete structure for grade separation on Chicago, Rock Island & Gulf

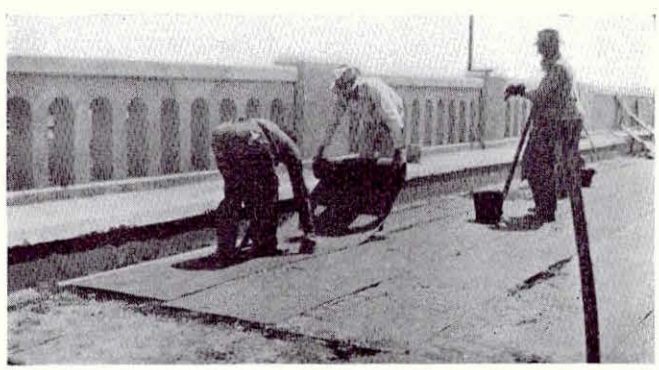
AN example of rigid-frame reinforced concrete construction, as applied to a railway-highway grade separation, is provided in a subway recently completed at Ringgold, Tex., to carry state highway No. 5 under the main line of the Chicago, Rock Island & Gulf between El Reno, Okla., and Dallas, Tex. This type of construction has been applied to only a limited extent in this country for structures carrying railroad tracks, but it was adopted in this case because studies indicated a saving of about 20 per cent in the cost, compared with a simple span steel structure, while a simple span concrete slab design was out of the question because it imposed a prohibitive floor depth.

Moreover, the conditions at the site favored the design adopted for the presence of shale at the level of the highway insured excellent foundations, and a stock pen track alongside the single main track solved the problem of handling traffic during construction. The stock pen had to be moved to another location to make room for the highway improvement, but the stock pen track was retained and shifted out far enough to avoid interference and was used as a shoo-fly to carry traffic.

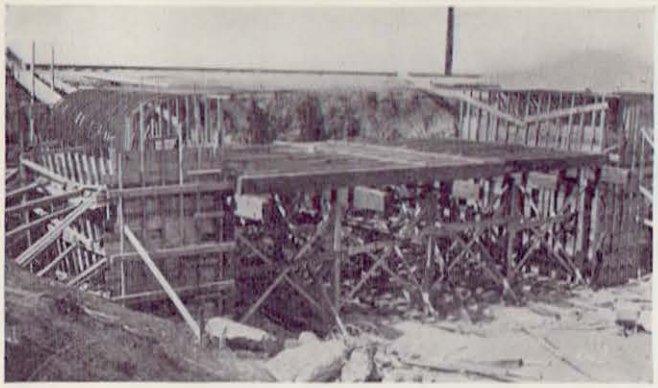
Depress the Highway

No change was made in the location of either the highway or the track, which cross at an angle of 83 deg. 17 min. The fact that the general level of the highway was about five feet lower than the track, and contingent conditions, led to the decision to effect the separation by depressing the highway; no change was made in the track grade. The excavation for the highway was through sand and clay loam to an elevation slightly above the new highway grade, where shale was encountered, the footing excavation being largely in the latter material.

The agreement for this separation called for a clear width of 42 ft. and a clear height of 14 ft. for a width of 33 ft., with the top of the pavement 20 ft. below base of rail. However, as considerations of both esthetics and structural design demanded that the soffit of the span conform to a curve (a parabolic curve with a rise of 28 in. above the spring line) and this curve had to circumscribe the clearance diagram for the high-



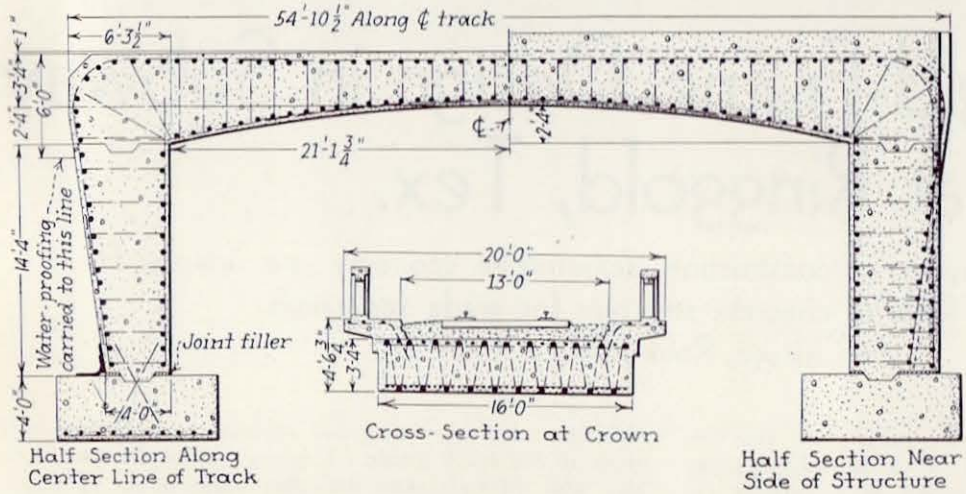
Applying the Asphalt Plank



View Showing Forms and Reinforcing

way, the subway has a clear headroom of 15 ft. 3 in. at the crown. The arch at the crown is 3 ft. 5 in. thick at the center line of the track and slopes one inch to each side, while the distance from base of rail to the top of the concrete is 1 ft. 4 in.

The span has a thickness of 5 ft. 8 in. at the spring line, while the walls are 6 ft. 3½ in. thick at the spring line and 4 ft. thick at the top of the footing. The structure is built on the skew, the abutments being parallel to the highway, so the span along the center line of the track is 3½ in. greater than the clear width perpendicular to the center line of the highway.



Details of the Rigid Frame

Parallel Wing Walls

The rigid frame structure is flanked by wing walls placed parallel with the track. These walls are tied together by cross walls and, with the walls of the rigid frame, form what is substantially the equivalent of filled U-type abutments. The tails of the wings are about 30 ft. from the faces of the subway walls, thus allowing for 1½ to 1 slopes of the embankment outside the wings.

The neat widths of both the span and the two U-type abutments are 16 ft., but the pilasters that flank the two portals of the subway project an additional distance of 9 in., while cantilevered sidewalks, that extend from end to end of the wings, give the deck a total width of 20 ft. 2 in. These walks are surmounted by concrete railings 3 ft. 8 in. high.

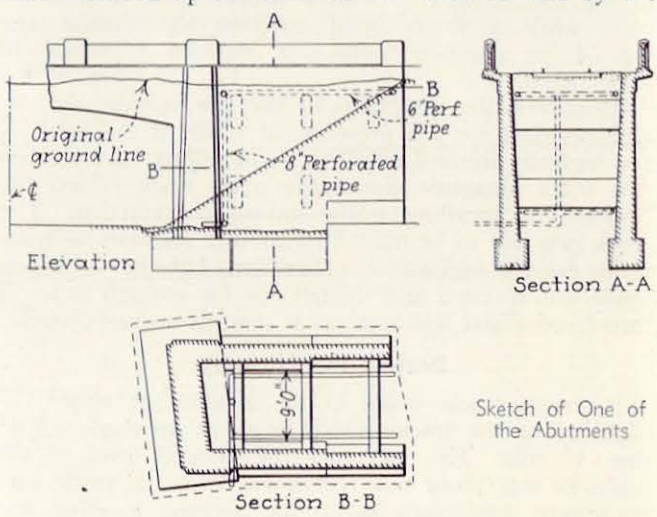
The abutments are supported on spread footings four feet thick. An articulated joint is provided between the footings and the neatwork by confining the bearing to the width of a 24-in. key and placing the dowels that connect the footing to the neatwork so that they pass through the center line of the key. Outside the key, the footing and neatwork are separated by a ½ in. thickness of joint filler.

The wing walls are separated from the rigid frame structure by joints filled with a ¾-in. thickness of joint filler, these joints being concealed by overlapping edges of the pilasters. The wings have stepped footings, and the walls, from 18 in. to 30 in. thick, are tied together by tie walls 1 ft. 3 in. thick by 4 ft. deep, and terminate at the top with cantilevered sidewalks.

Concrete Railings

The railings, which were constructed monolithic with the sidewalks, consist of a series of panels 3 ft. 4 in. high that are separated from each other by piers or blocks of concrete that are 4 in. higher and also thicker than the railing panels. Two of these piers in each railing, which serve architecturally as caps for the pilasters, are four feet wide while the rest have a width of three feet. Further architectural emphasis to the span is afforded by piercing the railing panels over it with openings 8-in. wide, 15-in. center to center, with semi-circular tops, but omitting these openings in the railings on the wing walls. It is of interest also that the railing panels are separated from the piers by ½-in. open joints. This insures that the railings will not be affected by the elastic deformations of the structure on which they rest.

Particular attention was given to the waterproofing and drainage of the structure. The track floor was covered with a three-ply membrane waterproofing that was extended up the sides of the curbs formed by the



Sketch of One of the Abutments

sidewalks and down over the ends of the structure for a distance of six feet below the floor surface, which was sloped one inch each way from the middle of the span. This waterproofing consisted of two layers of felt and one of cotton fabric and four moppings of asphalt, and was covered with asphalt plank 1¼ in. thick. The same waterproofing was applied in the horizontal corners where the backs of the walls join the tops of the footings, terminating the waterproofing in notches two feet above and two feet back of the corner. The remainder of the back wall surface was treated with a double-mop coating of asphalt pitch.

Drainage

The space inside of the wing walls is drained by a system of perforated corrugated pipes, embodying two U-shaped runs of six-inch pipe placed horizontally, one near the top and the other near the bottom, connected by an eight-inch riser that is connected at the bottom to a horizontal pipe that passes through one of the side walls to an outlet into the highway drainage. The pipes were laid in a crushed stone bed approximately two feet square in section.

To insure adequate resistance for the horizontal thrust transmitted by the frames to the footings, the specifications provided that the concrete placed in the footings must completely fill the footing excavation. The rigid frame structure was concreted in five runs, namely, one each for the two footings and the two walls to the level of the construction joints at the spring line, and a fifth comprising the span. In concreting the span, the work was started over each wall simultaneously and carried out progressively to a closure in the middle of the span. The specifications called for 3,000-lb. concrete throughout, and for a rubbed finish on all exposed surfaces. The structure was designed for E65 loading with 50 per cent impact.

Construction involved 580 cu. yd. of excavation, of which 145 cu. yd. was classified as solid rock, exclusive of the excavation required for the depression of the highway. Exclusive of the railings, the concrete work totaled 527 cu. yd. and required 60,336 lb. of reinforcing bars.

This subway was built as a PWA project, the design being developed under the direction of I. L. Simmons, bridge engineer of the Rock Island lines and the construction was under the joint supervision of the railroad and the highway department of Texas.

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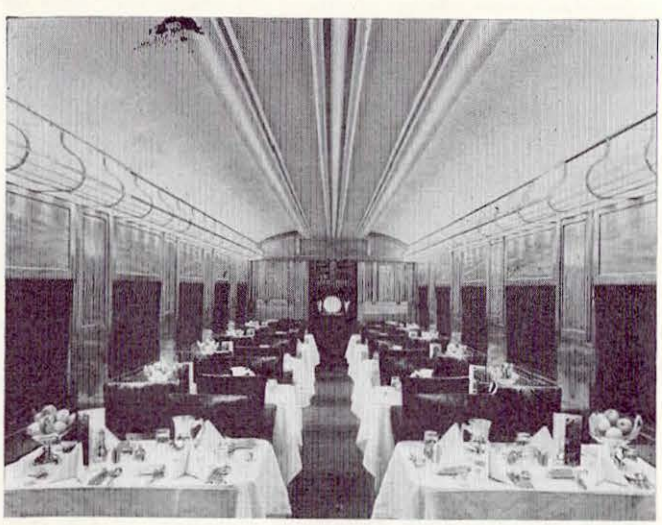

Interior View of the First Air Conditioned Dining Car on the Victorian Railways of Australia

Telephones on the U.P. Streamliners

THE newest streamline trains of the Union Pacific, the City of Los Angeles, the City of San Francisco and both units of the City of Denver, are the first to include a new type of telephone system, which provides communication between a trainman at any of three

stations and the engineman. Unlike those used by the ordinary type of telephone system, the transmitter-receiver instruments, known as "Magnetic Monophones," require no external source of electrical energy for voice transmission, the human voice itself furnishing the necessary power for that purpose.

The telephone system on each of the trains consists of four telephones; one in the front engine cab, another in the second power car, a third in the front baggage section and the fourth in the buffet coach. The system is used for train crew communication only.

The station in the front engine cab is connected to an amplifier-loud-speaker unit mounted near the engineman's seat, and no calling bell or signal is used at this or any other station. To talk with the engineman, a member of the train crew, located at any of the other three stations, needs only to speak into the transmitter after removing the telephone hand unit from its cabinet, the message being transmitted through the loud-speaker unit without any action on the part of the engineman. The engineman can converse with the trainman who originated the call by talking into a magnetic transmitter, but he cannot initiate a call. He can thus be given instructions without interference with his operation of the train.

The system provides specifically for telephone service between stations 2, 3 and 4 and the cab station, the connection in each instance being established by any one of the former. A relay arrangement is used to permit but one conversation at a time, with secret service. For example, if No. 2 were talking with No. 1, neither No. 3 nor No. 4 could cut in until No. 2 had finished and hung up. The "cutting in," or inauguration of a connection, is accomplished at each station merely by pressing a button on the handset. The circuit arrangement is such that only two wires are required between the stations, thus simplifying the wiring between the cars.

The telephones are contained in special built-in cabinets, which are kept under lock and key when not in use. The magnetic telephone system is a recent development of the Automatic Electric Company, Chicago, and the Union Pacific installations were designed and manufactured by that company.

I.C.C. Studies Light-Weight Passenger Trains

Statement of the Bureau of Statistics presents unit comparisons of weight, first cost and costs of operation

THE Bureau of Statistics of the Interstate Commerce Commission has recently issued a statement in which are presented the results of a comprehensive survey of the various new types of light-weight passenger trains. This statement, No. 3639, contains a condensed description of the trains, setting forth the principal materials of construction and the types of motive power by which they are hauled. Its value, however, lies in the unit comparisons of the new trains classified by types of motive power and between the new trains and conventional passenger equipment. The comparisons include weight, first cost, and operating and maintenance costs. The questions of speed, safety and comfort are also briefly considered.*

The data on which the statement is based were reported by the railroads in answer to a questionnaire issued on August 1, 1935, and cover the three months ended September 30, 1935. The facts thus secured were supplemented from the files of the Commission and in various technical articles in the *Railway Age*. An abstract of the statement follows.

General Description of the Trains

Eighteen new type light-weight passenger trains, all streamline, were operated by 11 Class I roads during the three months ended September 30, 1935. These trains can be divided into three groups: One composed of six trains, each consisting of seven or eight cars, four of which trains were hauled by steam locomotives, one by a Diesel-electric locomotive, and one by a Diesel-electric motor car; another group containing eight trains of three or four cars each powered by Diesel- or distillate-electric motor cars, and a third group consisting of gasoline-engine single-unit motor cars (or rail buses) which have been included in this study mainly for comparison with the multi-car trains. Table I gives the names of these trains, the roads operating them, where they are operated, and a description of their equipment.

The rated cylinder horsepower of the steam locomotives varied from 1,800 for each of the Hiawathas to 2,200 for the Royal Blue. The rated horsepower of the Diesel and distillate engines ranged from 600 horsepower for the Rebels, the Flying Yankee, and the Kansas Streamliner to 1,800 for the Royal Blue Diesel locomotive. The rail buses had horsepower of 176 each.

The rated tractive force of the steam locomotives varied from 30,700 lb. for each of the Hiawathas to 41,000 lb. (including booster) for the Royal Blue. The rated tractive force of the Diesel and distillate engines ranged from 18,000 lb. for each of the three Zephyrs to 50,400 lb. for the Royal Blue Diesel locomotive. The rail buses each had a rated tractive force of 4,930 lb.

The trains studied consist of various types of cars. The Hiawathas consist of four coaches, one dining car, and two parlor cars; the City of Portland of a power car, a baggage car, a diner-lounge car, three Pullman sleeping cars, and a buffet-coach; each of the Twin Zephyrs of a combination motor and baggage car, a combination coach and dinette and a combination coach and lounge car; and each of the Rebels of a combination motor, mail, and baggage car, a buffet coach, and a combination sleeping and observation car. The rail buses have a coach compartment and baggage compartment, with the motor under the floor.

Weight Comparisons

The average weight of steam locomotives which haul these light-weight trains may be compared with that of typical locomotives hauling high-speed passenger trains of conventional weight, such as the "Century," the "Broadway," and the Chicago & North Western "400," as in Table II. This indicates that the reduction in the weight on drivers was accompanied by a like decrease in rated tractive force. The reduction in the weight of the tender is due mainly to the reduction in capacity.

Table I—New Type Light-Weight Passenger Trains Included in This Study

Train and operating railroad	Where operated	Equipment
Hiawathas Nos. 100 and 101 (C. M. St. P. & P.)	Chicago-Twin Cities, Minn.	Steam locomotive 7 all-welded steel cars
Abraham Lincoln (Alton)	Chicago-St. Louis	Steam locomotive 8 Cor-Ten steel cars
Royal Blue (B. & O.)	New York-Washington, D. C.	Steam locomotive 8 aluminum alloy cars
Royal Blue (B. & O.)	New York-Washington, D. C.	Diesel-electric locomotive 8 aluminum alloy cars
City of Portland (U. P.)	Chicago-Portland, Ore.	Diesel-electric motor car 7 aluminum alloy cars
Rebels Nos. 352 and 353 (G. M. & N.)	New Orleans-Jackson, Tenn.	Diesel-electric motor car 3 Cor-Ten steel cars
Comet (N. Y. N. H. & H.)	Boston-Providence, R. I.	2 Diesel-electric motor cars 3 aluminum alloy cars
Original Zephyr No. 9900 (C. B. & Q.)	Lincoln, Nebr.-Kansas City, Mo.	Diesel-electric motor car 4 stainless steel cars
Twin Zephyrs No. 9901 and 9902 (C. B. & Q.)	Chicago-Twin Cities, Minn.	Diesel-electric motor car 3 stainless steel cars
Flying Yankee (B. & M. and Maine Central)	Boston-Bangor, Me.	Diesel-electric motor car 3 stainless steel cars
Kansas Streamliner—M-10000 (U. P. R. R. Co.)	Kansas City, Mo.-Salina, Kans.	Distillate-electric motor car 3 aluminum alloy cars
Rail buses Nos. 101, 102, 103 and 104 (Nor. Sou.)	Norfolk-Virginia Beach, Va.; Washington, N. C.-Raleigh, N. C.; Beaufort, N. C.-Goldsborough, N. C.	1 Cor-Ten steel and aluminum motor car powered by a gasoline engine with mechanical drive

The all-welded steel cars of the Hiawathas, the Cor-Ten steel cars of the Abraham Lincoln, and the aluminum alloy cars of the Royal Blue, are 31 percent, 40 per cent, and 46 per cent lighter, respectively, than equivalent cars of conventional riveted steel construction. The figures indicate only approximately the differences in the weights of cars made of the various metals, because some aluminum was used in the construction of the Cor-Ten steel cars and some steel in the aluminum alloy cars. The shell weight of the Cor-

* The discussions of speed and comfort have been omitted from this abstract.—EDITOR.

Ten steel cars is about 30 per cent greater than that of the aluminum alloy cars.

The average per unit weights of the various groups of trains are shown in Table III.

It is of interest to note that the latest type of intercity highway bus weighs 803 lb. per foot of inside length and 514 lb. per salable seat.

The weights of the steam-locomotive trains varied from 2,233 lb. per ft. of inside car length for the Royal Blue train to 2,504 lb. for the Hiawathas; among the Diesel- and distillate-engine powered trains from 1,235 lb. per ft. for the Original Zephyr to 1,779 lb. for the Royal Blue Diesel locomotive train. The rail buses showed no variation in weight.

Table II—Average Weight of Steam Locomotives in Working Order

	Type of locomotives		
	Light weight	Conventional weight	Per cent light weight of conventional
Locomotive and tender, lb.	486,667	653,333	74
Engine only, lb.	265,933	321,333	83
On drivers, lb.	131,933	189,343	70
On trucks, lb.	134,000	131,990	102
Tender, lb.	220,734	332,000	66
Capacity of tender, lb.	124,823	196,827	63
Rated tractive force, lb.	30,900	44,200	70
Ratio of weight on drivers to tractive force	4.27	4.30	99

There are several factors to which the variations in weight seem to be due. These include the type of motive power, the type of metal principally used in cars, articulation, air-conditioning, the kinds of cars making up the trains, and other elements in construction, such as the weight of the seats, of the trucks, and of other parts of the cars. It is rather difficult to isolate the effect of any one of the factors because there are many of them and but few trains.

Steam locomotives are substantially heavier than equivalent internal combustion engines. The substitution of a 252,000-lb. Diesel-electric locomotive for a 493,800-lb. steam locomotive reduces the weight of the Royal Blue train from 2,233 lb. per lineal foot of inside car space (excluding portions of cars used for motive power purposes) to 1,779 lb. The weight of the gasoline engines with mechanical drive of the rail buses is only 23 lb. per horsepower, as compared with 40 lb. and more for Diesel engines with electric drive.

Other things being equal, the length of the train has a definite effect on the weight per foot of length, for the longer the train, the greater the length over which the weight of the power car or locomotive is distributed. Articulation of cars is an important element in reducing weight by eliminating almost half of the trucks, drawbars, and diaphragm connections between the body units, with a saving of about 200 lb. per lineal ft.

Table III—Average Unit Weights

Trains propelled by	Average weight*	
	Per foot of inside car length, †	Per salable seat, lb.
Steam locomotives	2,373	5,489
Diesel and distillate engines	1,548	3,189
Gasoline engines (rail buses)	772	743

* Weight of whole train in working order but excluding paying load.
† Excluding portions of cars used for motive power purposes.

One reason that the rail buses are lighter than the other trains per foot is that they are not air-conditioned; air-conditioning equipment weighs between 4,000 lb. and 7,200 lb. per car.

There has been briefly discussed above the effect of the kind of metal on the weights of the cars in the Hiawatha, Royal Blue, and Abraham Lincoln trains. For the other trains, however, it is quite difficult to isolate the effect on weight of the use of the various kinds of metals from that of other elements in construction. For example, both the Rebels and the Abraham Lincoln are made of Cor-Ten steel by the American Car and Foundry Co. and are non-articulated, yet the coach of the Rebel seats 62, is 75 ft. 10 in. long, and weighs 78,000 lb., while the coach of the Abraham Lincoln seats 64, is 70 ft. long, but weighs 98,800 lb., or 27 per cent more.

The total investment of the steam locomotive trains varies from $279,847 for each of the seven-car Hiawathas to $479,193 for the eight-car Royal Blue train. The eight-car Diesel-electric locomotive Royal Blue train cost $574,343. The total investment in the seven-car City of Portland train is not yet available; the cost of only four cars (all cars except the three Pullman sleeping cars) was $425,000. The average cost of a three-car train powered by Diesel or distillate engine motor cars was $231,639, with a range from $184,175 for each of the two Rebels to $276,336 for the Flying Yankee. The rail buses cost an average of $24,611 each, with very little variation among them.

The average per-unit investments of the various groups of trains are shown in Table IV.

Probably the best comparative measure of investment is the cost per foot of inside car length excluding portions of cars used for motive power purposes. The cost per ft. of inside car length of the steam locomotive trains varies from $518 for each of the two Hiawatha trains to $899 for the Royal Blue train. The cost of the Diesel and distillate trains ranged from $955 per ft. for each of the Rebels to $1,652 per ft. for the Flying Yankee. The rail buses showed very little variation.

Table IV—Capital Investment Comparisons

Trains propelled by	Average capital investment		
	Per foot of inside car length*	Per pound of train weight†	Per salable seat
Steam locomotives	$679	$.32	$1,571
Diesel and distillate engines‡	1,263	.84	2,433
Gasoline engines (rail buses)	449	.60	432

* Excluding portions of cars used for motive power purposes.
† Empty weight.
‡ Excludes the City of Portland, whose total investment was not available.

Several factors affect the amount of the capital investment of the trains per ft. of length. They include the type of motive power, the kind of metal principally used in the cars, the length of the trains, the weight of the trains, and other elements in construction, such as the luxury of the appointments, etc. Again, it is difficult to isolate the various factors because of their large number and the small number of trains.

Diesel-electric engines cost much more than steam locomotives. For instance, the Diesel-electric locomotive which hauls the Royal Blue cost $180,000, or $100 per horsepower, while the steam locomotive which hauled the same train cost only $84,850 or $39 per horsepower. Doubtless, the high cost of the Diesel and distillate engines is a factor in raising the unit costs of trains thus powered.

Another element that is of importance is the type of metal used. Although it is not possible to isolate the effect of the cost of the metal, in some cases, such as the cars of the Abraham Lincoln, Royal Blue, and the Hiawathas, it is probably true that differences in cost are mainly due to the metal used and the factors

in construction that accompany the use of a metal. The aluminum alloy cars of the Royal Blue cost $740 per ft. of inside length or $.57 per lb. of empty cars; the Cor-Ten steel cars of the Abraham Lincoln cost $654 per ft. or $.45 per lb.; and the all-welded steel cars of the Hiawathas cost $346 per ft. or $.23 per lb. One coach of the Hiawathas costs $24,649 or $314 per ft., $.22 per lb., and $391 per seat (counting all 63 seats, including 15 in the lounge).

It is to be noted that the cost of the cars of the Royal Blue, Abraham Lincoln, and Hiawathas vary inversely as to their weight. In other words, the lighter the cars the more expensive they are. However, it must be taken into consideration that the cost of the metal used is only a part of the expense of manufacturing the cars.

Safety

During the year ended December 31, 1935, the following accidents (excepting those which involved only personal injury, through no fault of the train) were reported for the light-weight trains in question:

1. Hiawatha No. 100—October 31, 1935. Train struck truck trailer stalled on tracks. No persons injured. Damage to equipment, $335.

2. Hiawatha No. 100—December 12, 1935. Train struck auto at crossing. One auto passenger killed. Two auto passengers injured. No damage to train.

3. Abraham Lincoln—December 2, 1935. "Broken journal, coach 5803, permitted equalizer to drop down, forcing rail to turn over, derailing five following cars. Inspection of journal shows 40 per cent old defect, breaking off 1¼ inch from hub of wheel." No persons injured. Damage to equipment, $1,000; damage to way and structures, $136; cost of clearing wreck, $325; total cost, $1,461.

4. Royal Blue—July 5, 1935. Collision at terminal, engine coupling to train at excessive speed, damaging couplers. No persons injured. Damage to equipment, $390.

5. Royal Blue—July 27, 1935. Bottom blew out of hot water boiler in dining car. One passenger killed. Five persons injured (including one passenger). Damage to equipment, $606.

6. Royal Blue—December 20, 1935. "While running at estimated speed between 70 and 75 miles per hour, descending grade, right main pin broke on engine, stripping itself on both sides and derailing both rear drivers. Broken pin showed 50 per cent old defect. No other equipment in train derailed or damaged." No persons injured. Damage to equipment, $3,000; damage to way and structures, $3,500; cost of clearing wreck, $105; total cost, $6,605.

7. City of Portland—January 15, 1935. Passenger auto struck side of train. No persons injured. Damage to train equipment, $500.

8. City of Portland—July 24, 1935. Derailment because of a broken axle. No persons injured. Damage to equipment, $14,678; damage to way and structures, $918; cost of clearing wreck, $657; total cost, $16,253.

9. Rebel No. 352—June 23, 1935. Grade crossing accident. One auto passenger killed; two auto passengers injured. Damage to equipment of train, $136; damage to way and structures, $36; total damage, $172.

10. Original Zephyr No. 9900—January 31, 1935. Collision with auto at street crossing. Auto passenger injured. No damage to train.

11. Twin Zephyr No. 9901—June 3, 1935. Collision with auto at grade crossing. Two auto passengers injured. No damage to train.

12. Kansas Streamliner—M-1000—August 16, 1935. The axle on one of the trucks broke as the train was pulling into Kansas City terminal. Total damage amounted to less than $150. In view of this it was decided to change out all the axles and overhaul the entire train; the cost of the shop repairs was $16,794.

13. Rail Bus 101—April 13, 1935. Collision with auto at grade crossing. One auto passenger killed; three auto passengers injured. No damage to rail bus.

14. Rail Bus 101—July 9, 1935. Collision with truck at grade crossing. Motorman of rail bus, three rail bus passengers, and the driver of the truck injured. Damage to bus, $2,841.

15. Rail Bus 102—September 7, 1935. Collision with truck at grade crossing. Two occupants of truck injured. Damage to rail bus, $695.

16. Rail Bus 102—October 28, 1935. Auto struck rear of rail bus. No persons injured. Damage to rail bus, $200.

The figures for the light-weight trains during the three months period ended September 30, 1935, are only roughly comparable with annual averages for conventional trains which cover the operations of all similar passenger trains by Class I roads under all sorts of conditions for the year 1934. By direct maintenance and operating costs are meant the following expenses:

Table V—Comparison of Operating Costs of Light-Weight and Conventional Trains Drawn by Steam Locomotives

Expense item	Average direct costs per car-mile (cents): Light weight trains (three months)	Conventional trains (year 1934)
Repairs to locomotives	1.8	2.7
Repairs to cars	2.1	2.0
Fuel and water for locomotive	1.6	2.0
Cleaning, servicing, supplies and lubrication	2.6	1.3
Crew's wages	3.7	3.3
Total direct costs	11.8	11.3
Total direct costs per train mile	87.8	85.1
Average number of cars per train	7.4	7.6
Equated pounds of coal per car-mile	10.9	15.2

(1) Crew's wages; (2) Fuel and water; (3) Lubrication; (4) Supplies; (5) Repairs; (6) Cleaning and servicing.

The direct maintenance and operating costs of the four light-weight trains drawn by steam locomotives and those of conventional steam passenger trains (all steam passenger trains operated by Class I roads) may be compared as in Table V.

The difference in charges of repairs to locomotives is partly because the figure for the light-weight trains covers only running repairs, while that for the conventional trains includes shop repairs also; and partly because the light-weight trains were hauled by new locomotives of modern design which, regardless of any other factor, should have had lower repair costs than the much older locomotives which drew conventional trains in 1934. However, a portion of the saving by the light-weight trains was probably due to the reduction in weight, but how much cannot be determined accurately from the information available.

Repairs to cars were about equally expensive for the two groups of trains. It seems that these new light-weight cars being radically different in construction from cars heretofore manufactured has probably offset the greater age of the conventional cars and the fact that the cost of repairs for the latter includes shop repairs, while that for the former does not.

That the cost of cleaning, servicing, supplies, and lubrication per car-mile was almost twice as great for the light-weight trains was probably due in great measure to the fact that these new type cars were kept

Table VI—Average Direct Maintenance and Operating Costs of Motor-Car Trains

Type of motor-car train	Cents per train-mile	Cents per car-mile	Average number of cars per train
Light weight (3 months)	32.2	10.5	3.1
Conventional (year 1934)	42.3	15.7	2.7

immaculately clean and in perfect condition, while less attention is ordinarily given to many of the cars of conventional construction, especially those in local service.

The direct maintenance and operating costs of the 13 light-weight motor-car trains and of conventional motor-car trains (all motor-car trains operated by Class I roads during 1934) may be compared as in Table VI.

When the costs are broken down by type, the greatest difference arises between fuel costs; for the light-weight

trains they were 0.62 cents per car-mile and for the conventional trains 4.63 cents. This difference is partly due to the variety in types of engines; 96 per cent of the total light-weight car mileage was run by Diesel or distillate powered trains and 4 per cent by rail buses propelled by gasoline engines; on the other hand, 59 per cent of the total conventional-weight car mileage was handled by electric motor-car trains propelled by motors deriving current from power lines or storage batteries, and 40 per cent by gasoline motor-car trains propelled by gasoline engines. The fuel cost among the light-weight motor-car trains was 0.6 cents per car-mile for the Diesel and distillate trains and 2.1 cents for gasoline engine trains; among the conventional motor-car trains 5.4 cents per car-mile for the electric trains and 3.3 cents for the gasoline engine trains.

It should be noted that many of the light-weight motor-car trains were in high-speed service, while most of the conventional motor-car trains were in local service.

Comparisons Among Individual Light Weight Trains

The following data are based upon operations of the light weight trains included in this study during the three months period ended September 30, 1935.

Crew's Wages.—The average cost of crew's wages for trains having seven or eight cars were 28.9 cents per train-mile and 3.9 cents per car-mile; for trains with three or four cars, 16.9 cents per train-mile and 5.3 cents per car-mile, and for the rail buses, 13.8 both per train-mile and per car-mile. The figures for the three Zephyr trains included in the averages above contain the wages of only one man in the engine cab; since the date that the above data were submitted, another engineman has been added to each Zephyr.

Per train-mile, the cost of crew's wages for the seven- and eight-car trains varied from 26 cents for the steam-locomotive train Royal Blue to 37 cents for the City of Portland. The cost for the three- and four-car trains ranged from 15 cents for Rebel No. 353 to 24 cents for the Kansas Streamliner. The figures for the rail buses ran from 13 cents to 15 cents.

Table VII—Kinds and Quantities of Fuels Used

Number of trains	Motive power	Kinds of fuel	Average price	Average quantity consumed per 1,000 ton-miles*
2	Steam	Coal	$3.04 (per ton)	121 (pounds)
2	Steam	Fuel oil	2.0 (cents per gallon)	8.6 (gallons)
2	Diesel-electric	Diesel oil	3.4	3.1
5	Diesel-electric	Furnace oil No. 2..	4.2	3.0
1	Diesel-electric	Light fuel oil.....	5.7	3.7
1	Diesel-electric	Distillate	5.5	2.7
1	Distillate-electric	Distillate and gasoline†	4.7	†7.9
4	Gasoline-mechanical	Gasoline	7.8	13.0

* Includes the weight of locomotive and tender or power car, but excludes paying load.

† Of the total consumption of 7.9 gallons per 1,000 ton-miles, 5.8 gallons represents distillate and 2.1 gallons gasoline.

Fuel.—The kinds of fuel used by the light-weight passenger trains included in this study, the average costs per ton or per gallon, and the average quantities consumed per 1,000 ton-miles shown in Table VII.

The price of furnace oil No. 2 ranged from 3.6 cents for Twin Zephyr No. 9901 to 5.7 cents a gallon for the Royal Blue. The price of the gasoline used by the rail buses varied from 7.3 cents to 9.1 cents a gallon.

The consumption of furnace oil No. 2 varied from 2.8 gallons per 1,000 ton-miles for the Flying Yankee to 3.4 gallons for the Original Zephyr. The use of gasoline by the rail buses ranged from 10.4 gallons per 1,000 ton-miles to 14.2 gallons.

The average costs of fuel for the various groups of light-weight trains were 17.9 cents per 1,000 ton-miles, including the locomotive but not the paying load, for the trains propelled by steam locomotives; 14.3 cents for those propelled by Diesel and distillate engines, and 101.5 cents for the gasoline rail buses. Per car-mile the figures for the trains of the three types were, respectively, 1.5 cents, 0.6 cent and 2.1 cents. If the cost of water for steam locomotives, 0.8 cent per 1,000 ton-miles, is added to the cost of fuel (as both are necessary for locomotion), the resulting figure is 18.7 cents per 1,000 ton-miles for the steam locomotives.

The cost of fuel alone varied among the steam locomotive trains from 16.4 cents for the Abraham Lincoln to 22.3 cents per 1,000 ton-miles for the Royal Blue. The range among the Diesel powered trains was from 10.1 cents for Rebel No. 353 to 20.8 cents per 1,000 ton-miles for the Comet; the figure for the distillate engine Kansas Streamliner was 37.1 cents. The variation among the rail buses was from 94.6 cents to 115.8 cents per 1,000 ton-miles.

Lubrication.—The average lubrication costs per car-mile for the trains propelled by steam locomotives was 1.4 mills; for the trains propelled by Diesel and distillate engines, 3.2 mills, and for the gasoline rail buses, 4.8 mills.

The cost of lubrication for the steam locomotive trains varied from 1.2 mills per car-mile for each of the two Hiawathas to 1.8 mills for the Abraham Lincoln. The figures for the Diesel- and distillate-engine powered trains ranged from 1.1 mills per car-mile for Rebel No. 352 to 6.4 mills for the Kansas Streamliner. The variation among the rail buses was from 2.9 mills per car-mile to 8.3 mills.

Other Supplies.—The average costs of other supplies for the steam locomotives was .03 cent per car-mile and for the Diesel and distillate engines .02 cent per car-mile. Train supplies per car-day amounted to .67 cent for trains propelled by steam locomotives, .77 cent* for trains propelled by Diesel and distillate engines, and .26 cent for the gasoline rail buses.

Cleaning and Servicing.—The average cleaning and servicing charges per car-day for trains propelled by steam locomotives was $10.50; for trains propelled by Diesel and distillate engines, $6.01* and for gasoline rail buses, $2.44.

The cost for the steam locomotive trains varied from $8.36 per car-day for the Hiawathas to $13.32 for the Abraham Lincoln. For the Diesel and distillate trains it ranged from $3.77 for the Original Zephyr to $12.35 for the Royal Blue. The rail buses showed practically no variation.

Running Repairs to Motive Power and Cars.—The figures for repairs, both to motive power and to cars, suffer from the defect that all the trains had just been built and therefore most of the repairs that were necessary were negligible in comparison to what they would probably be subsequently when shop repairs became essential. To what extent the figures available (which cover operations for only three months and in some cases for even a smaller period) are accurate forecasts of future repair costs can not be determined accurately because these new type trains have practically no experience upon which such estimates could be made. On the other hand, in some cases repair charges were said to be higher than they would be subsequently be-

* The figure for the City of Portland includes expenses borne by the Pullman Company in connection with three sleeping cars owned by them estimated on the basis of similar costs borne by the Union Pacific in connection with the cars owned by the railroad.

cause the trains were still in the experimental stage.

The average unit repair costs for the various groups of light-weight trains were as shown in Table VIII.

The average cost of repairs to motive power per 100 horsepower-hours for the Diesel trains was 27.6 cents. (The figure for the distillate engine Kansas Streamliner was not available since no separation between costs of repairs to motive power and cars could be made from the data reported.)

Table VIII—Average Repair Costs of Light-Weight Trains
(Excluding Accident Repairs)

Trains propelled by	Total repairs per car-mile, cents	Repairs to motive power per 1,000 ton-miles*	Repairs to cars per car-mile
Steam locomotives	3.9	21.5	2.1
Diesel and distillate engines	2.9	25.9	1.8
Gasoline engines (rail buses)	2.9	†	†

* Includes the weight of locomotive and tender or power car but excludes paying load.
† Separation between costs of repairs to motive power and to cars was not available from data reported.

The above figures were adjusted by eliminating repair costs due to accidents to the City of Portland and the rail buses, or due to overhauling in shops to the Kansas Streamliner, and by adding in the case of the City of Portland, repairs borne by the Pullman Company in connection with three sleeping cars owned by them, estimated on the basis of similar costs borne by the Union Pacific in connection with the cars owned by the railroad.

Among the steam locomotive trains, total repair costs ranged from 2.6 cents per car-mile for the Abraham Lincoln to 4.7 cents for each of the Hiawathas. The variation among the Diesel and distillate trains was from 1.4 cents per car-mile for Twin Zephyr No. 9901 to 4.8 cents for the Flying Yankee. The range among the rail buses was from 1.2 cents per car-mile to 6.2 cents.

The cost of repairs to motive power varied from 17 cents per 1,000 ton-miles for the Abraham Lincoln to 26 cents for the Royal Blue among the steam locomotive trains. The corresponding figure for the Diesel trains ranged from 13 cents for each Twin Zephyr and the Royal Blue to 58 cents for the Flying Yankee.

The cost of repairs to cars for the steam locomotive trains varied from 1.3 cents per car-mile for the Abraham Lincoln to 2.6 cents for each of the Hiawathas. For the Diesel trains, the figure ranged from 0.9 cents for Twin Zephyr No. 9901 to 2.7 cents for the Flying Yankee.

Various Allocations of Total Operating Costs

The total direct maintenance and operating cost figures have been adjusted by eliminating repair costs due to accidents which are a large portion of total repair costs, or to overhauling in shops, and by adding in the case of the City of Portland operating costs borne by the Pullman Company in connection with three sleeping cars owned by them estimated on the basis of expenses borne by the Union Pacific in connection with the cars owned by the railroad. The figures for the City of Portland cover only the run from Portland, Oregon, to Omaha, Nebraska, on the Union Pacific lines. Figures relating to operations between Omaha and Chicago on Chicago & North Western lines were not available.

The average total direct costs per train-mile for the light-weight trains having seven or eight cars were 86 cents; for the trains having three or four cars, 32 cents, and for the rail buses, 20 cents. The range among the steam seven- and eight-car trains was from 79 cents for the Abraham Lincoln to 99 cents for the Royal Blue; among the Diesel long trains from 65 cents for the City of Portland to 90 cents for the Diesel-locomotive Royal Blue. Among the three- and four-car trains the figure runs from 24 cents for Twin Zephyr No. 9901 to 46 cents for the Kansas Streamliner. The cost for the rail buses ranges from 18 cents to 23 cents per train-mile.

The average costs per car-mile for the various groups of light-weight trains are presented in Table IX.

Depreciation at 5 per cent and interest at 5¾ per cent for the steam trains together amount to 3.0 cents per car-mile, for the Diesel and distillate engine trains 3.9 cents (assuming the investment of the City of Portland to be $725,000), and for the rail buses 3.5 cents. The total costs (including depreciation and interest) become 14.8 cents a car-mile for the steam trains, 14.0 cents for the Diesel- and distillate-engine trains, and 24.0 cents for the rail buses. The difference between the steam trains and the Diesel- and distillate-engine trains would be even less if they had similar schedules, for the latter have more car-miles per car-day, which enables them to spread their depreciation and interest charges, which are computed on a daily basis, over a larger number of car-miles than the steam trains. Obviously, if depreciation was computed at a different rate than here, or on a mileage rather than a daily basis, the conclusions reached would be somewhat different.

Table IX—Average Direct Costs in Cents Per Car Mile

Expense item	Steam locomotive trains	Diesel and distillate engine trains	Gasoline engine trains (rail buses)
Total direct costs	11.8	10.2	20.5
Crew's wages	3.8	5.1	13.8
Fuel and water	1.6	0.6	2.0
Cleaning and servicing	2.2	1.1	1.2
Running repairs	3.9	2.9	2.9
Lubrication and supplies	0.3	0.5	0.6

The variation of total direct costs per car-mile (not including depreciation or interest) is greater among the Diesel and distillate trains than among those powered by either steam or gasoline engines. The range for the Diesel and distillate trains was from 8.1 cents for Twin Zephyr No. 9901 to 15.4 cents per car-mile for the Kansas Streamliner. For the steam locomotive trains, the variation was from 10.3 cents for the Abraham Lincoln to 12.7 cents per car-mile for the Royal Blue. The corresponding figures for the rail buses ran from 18.3 cents to 23.4 cents per car-mile.

Table X—Other Allocations of Average Total Direct Costs

Item	Steam locomotive trains	Diesel and distillate engine trains	Gasoline engine trains (rail buses)
Per seat-mile*	$.0035	$.0030	$.0037
Per ton-mile†	.0014	.0025	.0102
Per train-hour	49.74	18.47	4.30
Per train-day	409.48	206.50	42.27
Per car-day	55.20	58.25	42.27

* Seat-miles in coaches, parlor, and sleeping cars.
† Includes the weight of locomotive and tender but excludes paying load.

The costs per seat-mile in Table X suffer from the defect that some trains have more of their space available for passengers than others. The main weakness of per ton-mile costs is that they penalize the lighter trains.

Organization and Discipline Become Outstanding Problems

Superintendents consider the training of supervisors and the proper handling of men

THE problems of proper organization of supervisory forces and the application of discipline are always of direct concern to division operating officers. They are particularly so in these days of increasing business. For this reason two committee reports bearing on these matters were presented at the recent convention of the American Association of Railway Superintendents.

The report on the proper organization of supervisory forces, which was presented by R. C. Randall, chairman of the committee and superintendent of the Erie at Jersey City, N. J., is abstracted below:

Importance of Proper Organization

The committee has made an extensive research into the practices generally in vogue on American railroads in the employment, training, education, advancement and social life of the personnel in our railroad organizations. The committee, as a result of this study, and from first hand opinions and viewpoints obtained from many outstanding railroad executives and other recognized authorities, has reached the conclusion that the railroads have too long concentrated their attention on the specifications, stresses, durability and prices of materials and have given too little attention to the application of some such standards to the human factor.

Operating organizations are composed entirely of human factors, motivated and controlled by policies, rules and practices. These human factors have heretofore been absorbed as needed without any pretense being made to determine capacity, quality or dependability. A position becomes vacant, an applicant appears; if he meets the few stipulated requirements he is employed. In many cases, weeks or months later some deficiency is disclosed.

Abnormal conditions, such as seasonal peaks, unusual weather, accumulation of traffic and other causes, have also been responsible for hasty employment with its flaunting of specific standards. Invariably under such circumstances, undesirables have been absorbed into the organization.

No Planned Constructive Educational Program

After a candidate has been employed he is forgotten, unless by his own ingenuity he forces someone's attention upon him. In other words, no planned costructive program has been arranged to improve his knowledge and thereby endeavor to increase his capacity. Personal contacts are usually with his immediate superior. The general policy has been akin to the philosophy expressed by Topsy in Uncle Tom's Cabin, when she said, "I wasn't borned, I jess growed."

Consideration should also be given to those employees already in the service. Beyond providing safety education, classes for study and examination on rules, and periodical physical examinations, is any attempt being made to further educate and improve these men? Are we satisfied that the rules and standards are properly understood; that their application and the reaction of individuals thereto is reasonably uniform? Where attempts have been made to determine the true situation, results have indicated a number of instances of lack of knowledge and uniform understanding.

Selecting Supervisors

From an organization built on a foundation of unstable and hasty employment methods, wherein provision has not been made for a program of constructive education, we have, as a general rule, selected the supervisors —the leaders. True, many men, intelligent, industrious and capable, have graduated from this workshop to higher posts of responsibility, but much latent talent has been overlooked by the hit-and-miss methods of development and selection heretofore in vogue.

For nearly seven years few new employees have been taken into our organizations. During this period many supervisors were relegated to the ranks, and if advanced again it is necessary that they be revitalized or reimbued with that spark of leadership with which they were out of touch so long. Furthermore, most of them are seven years older than when set back; this in many cases is an important consideration.

Owing to deaths, retirements and other changes in the supervisory ranks, many organizations have had to sift all the wheat from the chaff in their present personnel in search of supervisory material, and are now wondering where they will obtain those needed in the future. The time has come when we must face facts and recognize that new conditions in this industry are making necessary higher qualifications for both the supervisor and the employee.

Inasmuch as operating organizations are made up entirely of human factors guided by policies, rules, methods and practices, it should now be apparent that added strength can be obtained through the application of advanced ideas in the selection, employment and training of personnel and in the selection and training of supervisors.

Definite Policy Necessary

In order to effect any change in the standards for selection and development of personnel, some definite change in policy and method will be necessary. In many occupations the reservoir of laid-off employees eligible and available for reemployment in their former capacities, is becoming exhausted, and in the not-too-distant future it will be necessary to employ those who have not previously been in railroad service. Consideration should also be given to the effect of retirement legislation under which, if constitutional, there will be a considerable number of older employees accepting retirement, with the consequent promotion of employees

now in service and the employment of additional ones to take their places.

At present many are unemployed, including high school and college graduates, therefore, it would seem an opportune time to build up a reserve of prospective material obtainable for future consideration. It is more important than ever before for employing officers to consider carefully the qualifications of each individual making application for employment. There was a time when we had a job for the man; now the question to decide is, which man for the job.

Generally the judgment of employing officers must be considered an important factor in selecting men for employment in different classes of service, and this point should be stressed so that they will fully realize their responsibility. In the past the selection of personnel has too often been left to subordinates and they have not always employed the most satisfactory person available.

It is not always feasible to operate a central office for the direct engagement of all personnel for a railroad whose activities extend over a wide territory; therefore, employment problems have been handled at local points. A selected staff of employing officers, chosen for and trained in this particular work and located at strategic points along the line, or working from some central point, personally interviewing and selecting each candidate on a basis of uniform standards, would without doubt improve the quality of employees selected.

Qualifications

Henceforth, we should insist on a high degree of physical and mental excellence. Educational qualifications should be of the highest attainable, varying to some degree with the position to be filled and the prospects of advancement from such positions. Rapid progress has been made toward scientifically developing physical fitness, but the necessity of and methods for determining mental capacity, alertness and attitude are just beginning to take definite form.

It seems so ineffective to employ those lacking reasonable mental stability, or those whose makeup is such that they cannot or will not co-operate. Certain tests have been developed which are claimed to indicate rather clearly a person's effectiveness along these lines. Other industries are now using them to advantage, as well as some few railroads.

After an applicant has been interviewed, examined and accepted on a probationary basis by the employing officer, a further arrangement might be suggested wherein:

1. The immediate supervisor would be required to report on a specified form once each week during the probation period his observations as to the candidate's attitude, behavior, adaptability, industry and comprehension.

2. The next ranking supervisor would be required to contact the candidate each 15 days during probation, and develop the candidate's impressions of the job, the progress he is making, the matters he does not comprehend, etc.; a written report to be made of this supervisor's opinion of the candidate.

3. The next ranking officer would be required to contact the candidate at least three times during the probationary period, formulating his opinion of the candidate's fitness and adaptability for the position for which he has been employed.

4. Reports of all supervisors would be forwarded direct to the superintendent for such study and further conference as is found necessary. The superintendent should then make his final recommendations to the designated officer as to the acceptance or rejection of the applicant and reasons therefor.

No railroad should knowingly take into its employment those who are not amenable to set policies. Wholehearted co-operation on the part of the employees, with a sympathetic understanding of the problems confronting the organization, are particularly essential for the best results. Therefore, it seems logical that inquiry should be made as to the views of applicants concerning the controversial questions of the day, in-so-far as they are related to railroad operation.

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A program of regular meetings may be arranged and employees invited to attend, at which rules, methods and practices will be disclosed and demonstrated where possible. Competent officers should be delegated to conduct such meetings.

As a follow-up to these meetings, a series of progressive examinations may be arranged in a simplified form, devised so as to determine definitely the employee's knowledge of the important fundamentals and details. Such examinations, if given, should be under the most favorable conditions in order to bring out the true knowledge of the employee on the subjects involved.

Employees making favorable showings on the progress reports and indicating unusual aptitude should be encouraged. Suggestions may be given regarding beneficial reading matter, study or lectures. It would, also, be well to bring to their attention the opportunities that are available for progress in the organization. Personal interest, indicated in a manner that cannot be misconstrued by others as personal preference or partiality, is often the incentive that spurs individuals to greater proficiency.

One of the most difficult problems is the selection and training of supervisors. The field for selection is dependent on the policy of the management. Employees in the service can be advanced from the ranks, or new personnel, such as graduates of colleges or outstanding material from other industries, can be brought into the organization. Certain qualifications are essential in the first class; namely, character, experience, ability, initiative and personality; other candidates should have character, personality, educational background, ambition and a willingness to work hard in order to acquire the other requisites.

The apprentice arrangement puts the chosen ones in a position to be targets, and emphasizes the fact that there is a favored group from which supervisors are chosen, with the natural reaction that others have no chance. Furthermore, any apprentice arrangement, to be effective, should be on a scale that would be quite costly.

From the point of view of general morale, college men should not be brought into potential supervisory positions to the exclusion of employees from the rank and file. The filtering of college men into the supervisory class in reasonable proportion to those elevated from the ranks will tend to improve the supervisory force through the natural exchange of ideas between the two classes—one, of learning; the other, experience. If the opportunity is available, the college man should be started

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in clerical or similar positions until the fundamentals of the operation are acquired. He should then be placed in some minor supervisory position where the responsibilities are not great, preferably where guidance can be afforded by someone of experience.

Training Supervisors

New supervisors should be trained gradually to assume the added responsibility. Their use for the relief of other supervisors and during vacation periods affords an excellent opportunity for their development, and enables the department head to measure their capabilities under fire. The best of advice and counsel should be given by superiors. Early mistakes must not be taken too seriously for improper or undue criticism in the beginning can break an individual's morale. Errors should be used constructively as stepping-stones to improved attainment in the future.

Meetings should be held on each division with regularity for the benefit of supervision of all classes. Monthly staff, safety, fuel and freight claim meetings, some or all of which are now a part of the regular program on most divisions, provide an excellent opportunity for an exchange of ideas, and will increase the individual's knowledge of the problems for which supervision is responsible in their respective territories.

Social activities among employees can be of distinct advantage if properly directed into constructive channels. Through this medium an opportunity is afforded the supervisory officer to contact the employee and his family under conditions most favorable, and on a plane wherein the employee can be studied to advantage. Support for many questions of policy or regulation can be secured under such circumstances that could not be obtained otherwise. Furthermore, social communion between employees and the families of employees is bound to produce a more universal railroad family spirit, which seems so necessary today, surrounded on all sides as we are by disturbing influences.

Proper Discipline

The report on discipline, presented by a committee of which V. Parvin, general superintendent, Ann Arbor, was chairman, is abstracted below:

There is no question on the part of the management or the employees as to the necessity for discipline, owing to the characteristics of the industry and the necessity for the observation of all operating rules to avoid death, injury or great property loss. The employees themselves should feel a much greater security on a road where discipline is rigidly but fairly administered, which tends to bring about safer operation with only rare violation of operating rules. The supervision of employees of the transportation or operating department requires some form of discipline for the reason that even on the roads with the greatest amount of supervision, the employees are practically alone in the performance of their duties, the supervising officer being many miles away.

A number of roads were selected at random to which questionnaires were sent, requesting information regarding methods of discipline and cases appealed to the present board. Among the roads selected were large and small roads, short lines and switching roads, in all sections of the United States and Canada. Replies were received from 60 roads and of these 19 roads which use the Brown System have had 26 cases appealed to the board; 14 roads which use the modified Brown System, so called, have had 53 cases appealed; and 27 roads which are miscellaneous methods have had 25 cases appealed.

Varying Methods

There are two disciplinary methods which vary to a great extent from either the Brown System or many of the miscellaneous methods. One provides for the application of discipline by direct or deferred suspension. Under this method an employee who ordinarily would be given five days actual suspension, has the discipline assessed and this is then deferred. Thereafter, if the employee has a clear record for three months, he does not serve the five days; while if he does not have a clear record of three months he must serve the five days. Under the other method a guide is put out for administering discipline to train service employees, indicating the action to be taken for the most usual rule violations, for example: three to five days' suspension for improper display of train signals; 10 days' suspension for exceeding speed restrictions, etc. It further provides that a part, but not all, of the suspension may be given as a suspended sentence. It gives the supervisory officer full authority to deviate from this set rule if it is a first offense or if the employee has an exceptionally good record. To avoid the discipline, an employee must have a clear record for 10 months.

There is now, as never before, a necessity for keeping a definite personal record of each employee and this record should include all discipline administered, even down to and including a caution, as well as a record of meritorious work. Meritorious work is something of an outstanding nature performed by an employee, outside of his regular duties, such as discovering defects on a train other than his own which might result in damage or an accident.

Many supervisory officers, who see a man "slipping," call in the man to acquaint him with the faults which are beginning to appear and which, if not corrected, may eventually get him into considerable difficulty. In some cases a supervisory officer may appeal to a committeeman to help out with some employees. A record should be kept of all such cases. It is a reflection upon a supervisory officer to allow an accumulation on the service record of an employee sufficient to justify dismissal, unless he has a record of his efforts to correct the employee's faults. It does not require a lot of executive ability to let matters drift until it is necessary to dismiss a man, but it does require ability and ingenuity to do the things that will make dismissal unnecessary.

Discipline is weakened in any case where the local officers are not supported. Furthermore, discipline should not be removed or a dismissed employee reinstated without the approval of the officer who applied the discipline. There should be no disciplinary action taken until a thorough and impartial investigation has been held by responsible and competent officers, following which there should be judicious recommendations for discipline by the investigating officers, taking into consideration the character and previous service record of the employee involved.

There is a need for a more uniform method of discipline, as the results to be obtained on all railroads should be the same. Therefore, the best uniform method of obtaining this result should be developed.

No method of discipline will serve its purpose unless the supervisory officer is able to convince the employee of the fairness of the action taken and secure an admission from the employee involved of his responsibility. This, of course, will be found impossible in many cases, but it is worth the effort on the part of the officer.

Sec. 77 Full of Imperfections

Should recapitalization be effected on present or prospective earning power?—Act must be amended

By Robert T. Swaine

Part II*

OUR first question has dealt with procedure. Our second question, "What sort of capitalizations can be expected to emerge from reorganization proceedings now pending?" is one of substance. Whatever may be our view as to the propriety of governmental intervention in, or control over, the determination of the relative interests of the several classes of security holders, there can be no doubt that in the determination of both the aggregate amount and the character of the capitalization to be issued in a reorganization, the public interest is paramount and a public administrative body should be vested with an adequate power of veto to protect that interest.

Nature of the Dilemma

In the few reorganization plans which have been brought before the Interstate Commerce Commission during the recent years, both the security holders and the Interstate Commerce Commission have been faced with this dilemma: If the current earning power of an insolvent railroad be taken as a basis for recapitalization, existing stock and junior bonds must, in most cases, be eliminated entirely, and senior bonds held by insurance companies and savings banks must be commuted into stock, a form of security which under the laws of most states such institutions cannot hold indefinitely. Neither senior nor junior security holders have been willing to admit that railroad earnings will stabilize at the low levels prevailing through 1935 or to accede to the injustice which would result to all classes of security holders if such an assumption were acted upon but should later prove to have been mistaken. Nor has the Commission itself evidenced any desire to force such a result.

If, on the other hand, a more optimistic view of the future be taken and a reorganization plan attempted on an assumption of earnings materially above those prevailing yet materially below those of the pre-depression years, the resultant capital structure, if it is fairly to reflect the relative rights of the several security holders, and leave all classes an interest in the reorganized property, must necessarily involve a substantial amount of income bonds and must also necessarily involve an aggregate capitalization approximating that of the insolvent debtor. Such income bonds, and indeed all the securities involved in any such aggregate capitalization, are dependent both for ultimate income and ultimate principal value upon an improvement in earnings which cannot be predicted with any confidence.

This optimistic view is, of course, the easier one and was the horn of the dilemma chosen by those railroad managements which were placed under great compulsion by governmental bodies to submit reorganization plans during the depth of the depression. Such plans not only fell afoul of the Interstate Commerce Commission's previous adverse criticism of income bonds but also, almost immediately upon their promulgation, became of doubtful feasibility because of the continued decline of net earnings. Several of the plans more recently promulgated by insolvent debtors evidence a persistence of the same kind of optimism.

Proposed Governing Principles

It seems most doubtful that the Commission will approve any plan if either its aggregate capitalization or its debt charge, whether fixed or contingent, contemplates a return of earnings to the liberal scale of those prevailing immediately prior to the depression. It would seem doubtful that the Commission's view will be any less conservative than that expressed by the protective committee for the holders of Missouri Pacific First and Refunding Mortgage Bonds in its circular of June 5, 1936, in which, after stating that the problem of reorganization in that case was largely a financial one and that the major result to be attained was the reduction of the capitalization, particularly of the debt, to a safe and reasonable level, said:

> This, the Committee believes, should be done in accordance with the following principles:
> 1. The fixed interest debt must be limited to an amount upon which interest will be earned under the most unfavorable conditions reasonably to be expected.
> 2. The contingent interest debt should be limited to an amount upon which interest can be earned under normal conditions.
> 3. The preferred stock should be limited to an amount upon which dividends could be paid under conditions slightly above normal.
> 4. Common stock should be limited to an amount upon which a fair return could be paid in times of prosperity.

In applying the first of these principles, it must be assumed, however, that the Committee did not believe, nor will the Commission require, that the fixed charges of reorganized railroad companies must be reduced to such an amount that they would have been earned in every year of the depression. I take it that the committee meant, and that the Commission will require, that fixed charges shall be kept down to an amount which could be provided out of earnings equal to the average of earnings over the period of, say, 1930 to 1935 inclusive.

Aggregate capitalization to be issued in the reorganization having been determined, controversy can be expected as to the division of that capitalization between existing security holders.

The first of these controversies will of course lie between the different classes of debt secured by liens upon different parts of the property to be embraced in the reorganized system. The problem of evaluating such different liens, however, will be largely a mathematical problem to be resolved upon the basis of formulae in which accountants with the assistance of engineering experts will largely guide the determination of the Commission and the courts.

Stockholders vs. Bondholders

The more sharp controversy will lie between the creditors, particularly the senior creditors, on the one hand, and the owners of the equity, whether stockholders or junior creditors, on the other hand. During the depression substantial currency has been gained by the as-

*The first part of this paper was published in the *Railway Age* of August 15, page 249.

sumption that the purpose of Section 77 and Section 77B of the Federal Bankruptcy Act was not to provide machinery whereby creditors and stock holders might readjust their relative rights in such a manner as to fit the reduced earning power of their investments while maintaining their relative priorities, but that the object of these acts was to provide an instrument whereby equity owners could, for their own benefit, deprive creditors, particularly holders of mortgages, of their antecedent legal rights. The proponents of this philosophy will meet curt disappointment in the courts, whatever may be their fate at the hands of the Commission.

Following the decision by the United States Supreme Court in the famous case of *Northern Pacific vs. Boyd,* the federal courts, including the United States Supreme Court, have made it abundantly clear that a reorganization plan which does not give to every creditor, in the relative order of his priority, an opportunity to recoup the amount of his claim against an insolvent property before the stockholders receive anything, is fraudulent and void. Prior to 1933 the courts had repeatedly held that reorganization plans must be "fair and equitable." Those words, under judicial decisions, had become words of legal art, and when they were adopted by Section 77 and Section 77B they retained their antecedent meaning. *In my opinion, therefore, no reorganization plan can be sustained which attempts to preserve any interest in any junior security, be it debt or stock, by not allowing to senior creditors securities which afford the possibility that such senior creditors may ultimately recover the full principal and interest of their claims against the property.*

I have no doubt that in view of current conditions in the money market interest rates upon new securities issued in a reorganization may properly be lower than interest rates borne by the defaulted securities for which they are exchanged; but such rates must not be reduced so low that the new securities can have no hope of attaining a market value of par. I equally have no doubt, and the Supreme Court has so held, that the prior rights of creditors over stockholders do not require that all creditors shall be given securities all of which are qualitatively prior in rank to the security given to the stockholders. On the contrary, the creditors' priority may be recognized quantitatively, that is, by giving to the senior security substantially more securities of the same class as those given to the junior position and on better terms.

While the Commission has indicated, particularly in its decision in the Milwaukee reorganization of 1928, that it does not favor the issuance of income bonds in reorganizations, it seems quite likely that it will not insist that the prevailing level of railroad earnings shall set the top limit of interest-bearing securities. Of course, if that level is not set as a limit, the Commission will be compelled to permit the issuance of some income bonds in reorganizations. In the case of several debtors now in reorganization proceedings the accumulation of interest upon income bonds has had an adverse effect upon their credit, even before they were forced into bankruptcy. It is therefore probable that the Commission will be chary of permitting interest upon income bonds to be cumulative or, in any event, cumulative over any substantial period of years.

Creditors Must Be Given "Rights"

But whatever sacrifices may be sought to be imposed upon the creditors, it is my opinion that they must be compensated in some manner, as, for example, by granting rights of participation in earnings over the fixed dividends upon any preferred stock which they will receive, or by granting to some of the securities which such creditors are given, rights of conversion into the equity. By such compensating features creditors will be given opportunity to participate in any marked revival of prosperity and the sacrifices which they make during the period of depressed earnings will not redound solely to the benefit of the equity should prosperity ever again be permitted to our railroads.

It has been urged, and some of the current plans contemplate, that senior creditors shall be asked to forego interest which has accumulated during the period of the reorganization proceeding. Lawyers espousing such plans cite in their support the rule under the Bankruptcy Act that all interest terminates upon the filing of the bankruptcy petition. But even a superficial examination of the cases applying that rule shows that it is applied only as between creditors of equal rank in the distribution of the assets of a bankrupt which are insufficient to meet all of its obligations. The courts have repeatedly held that *where, upon liquidation of a bankrupt estate, the assets realize an amount more than sufficient to meet the principal of the debt, with interest to the date of filing of the bankruptcy petition, the additional interest accruing upon the debt up to the date of distribution in liquidation must be paid to the creditors before anything may be paid to the bankrupt.* Accordingly, it seems clear that no plan which contemplates that creditors shall waive back interest, receiving no adequate securities in exchange therefor, can be held valid if the plan allots securities to other creditors or stockholders junior to such creditors.

Difficulties of Using R. F. C. as New Capital Source

In almost every railroad reorganization the raising of new money is imperative. It was the necessity for raising such new capital which was the basis for the conventional assessments of stockholders in practically every railroad reorganization prior to the enactment of Section 77. It was also the fact that the stockholders furnished an available market for the raising of new capital which justified the alloting of securities to the stockholders in the reorganization when creditors were not paid off in full. In the negotiation of reorganization plans during the last two years, however, a new source for obtaining such capital has appeared, namely, the Reconstruction Finance Corporation. That Corporation has, with varying degrees of effectiveness, in several cases offered to furnish the new required capital at a cost which, without further analysis, seems to be much lower than can be obtained from any other source.

Superficially, it would seem that this should make the problem of accomplishing reorganization easier. But in all the cases with which I have had any experience, the situation has been complicated by the fact that the R.F.C. was itself a large creditor of the debtor company and its offer of new capital at an apparent low cost has been conditioned upon its receiving in the reorganization better treatment as a creditor than that to which its legal position as such creditor entitled it. I have no doubt that the amount by which the R.F.C. will reduce the cost of new capital below the cost of obtaining such capital commercially furnishes a measure of consideration for giving it, in its capacity as a creditor, better treatment than it would otherwise be entitled to receive, but the extent of that better treatment must be limited in value to the value furnished by the R.F.C. in providing new money at better terms. The evaluation of such dissimilar factors obviously affords a field for disagreement between the creditor thus proposed to be favored and the creditors whose position is adversely affected by such discrimination.

Assuming that all the clumsy red tape prescribed by Section 77 has been successfully unwound and all the

constitutional difficulties inherent in the Act have been successfully avoided, assuming that the approval of the Commission and the courts has been obtained for both the aggregate capitalization to be issued by the new company and the manner of its division among the old securityholders, what will the experience of the reorganization indicate as to the future of the property as a private venture?

Security Owners Have No Attribute Except Loss-Bearing

I have pointed out the many respects in which governmental fiat has been substituted for private initiative and private bargaining in the field of railroad reorganization in respect of matters wholly private in character. This is but one evidence of a trend in philosophy affecting the whole field of the government's relationship to the railroads. I need not recount the reams of legislation both federal and state imposing governmental control over an infinite number of operating and financial problems. I need not recount the intolerable burdens imposed upon revenues, not alone by property and income taxes but by legislation such as the Railroad Retirement Act and the Social Security Act and by action in form voluntary but forced by legislative threat as in the case of the recent Crosser-Wheeler Bill. The railroad security holder, whether he be bondholder or stockholder, has been left with substantially no attribute of ownership other than the obligation to stand the losses of the venture. Railroad managements and railroad securityholders can have little hope for the future of their investments if the trend of political, economic and legal philosophy applied to their management and their reorganization is to continue that of the last few years.

In another field, a sincere and scholarly member of the President's cabinet has entitled a thought-compelling work "America Must Choose." America must choose the philosophy to be applied to its railroad problems, including the problem of reorganization. There cannot be both private management and governmental management. The railroads of today are in such a plight that very few of those now in Section 77 proceedings can fairly be reorganized. The industry affords little attraction to private investors to furnish the capital necessary even to make up the deferred maintenance and obsolescence which have accrued during the depression. The American public will insist upon the high standards to which it became accustomed under private initiative and management. If the philosophy which now underlies governmental treatment of railroads and which underlies Section 77 as it now stands, is to be the prevailing philosophy, those standards cannot be maintained by private capital, but only by the government itself taking over the railroads.

Federal Operation Threatened Unless Act Is Amended

If the American public desires government ownership and operation of railroads no one can gainsay its right thereto. But if it does not desire that form of railroad operation, should there not be a complete overhauling of much of the railroad legislation of the last decade, including Section 77, with a view to removing governmental bodies from the field of management control and returning them to the field of regulation? On the other hand, if it is the desire of the American public to have government ownership and operation, would it not be a more honest approach to the problem and a more honest dealing with the millions of dollars of railroad securities held by insurance companies and savings banks that Congress should frankly and promptly take the necessary steps to that end rather than continue to cripple railroad properties and railroad security holders by burdensome and obstructive legislation?

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended August 8 totaled 728,293 cars, a decrease of 19,258 cars as compared with the week before but an increase of 146,216 cars as compared with the corresponding week of last year. Increases over last year's figures were shown in all commodity classifications. An increase of 60,423 cars was reported for miscellaneous freight. The summary as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, August 8

Districts	1936	1935	1934
Eastern	146,026	122,688	125,516
Allegheny	146,087	109,478	107,982
Pocahontas	51,315	37,676	39,253
Southern	96,842	79,121	80,674
Northwestern	124,622	91,489	96,288
Central Western	107,928	92,854	101,245
Southwestern	55,473	48,771	53,010
Total Western Districts	288,023	233,114	250,543
Total All Roads	728,293	582,077	603,968
Commodities			
Grain and Grain Products	46,451	41,446	41,190
Live Stock	14,717	11,286	32,108
Coal	114,524	77,853	92,372
Coke	8,450	5,000	3,809
Forest Products	35,199	29,758	23,368
Ore	54,206	32,106	29,256
Merchandise L.C.L.	165,724	156,029	158,521
Miscellaneous	289,022	228,599	223,344
August 8	728,293	582,077	603,968
August 1	747,551	595,297	612,660
July 25	731,062	595,572	610,042
July 18	720,402	592,672	616,040
July 11	724,324	565,502	604,192
Cumulative Total, 32 Weeks	20,892,261	18,562,975	19,004,266

Car Loading in Canada

Carloadings in Canada for the week ended August 8 totaled 46,036, as against 46,471 for the previous week and 41,750 for the comparable 1935 week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
August 8, 1936	46,036	21,553
August 1, 1936	46,471	22,324
July 25, 1936	44,706	21,984
August 10, 1935	41,750	17,337
Cumulative Totals for Canada:		
August 8, 1936	1,399,619	742,343
August 10, 1935	1,371,563	690,796
August 11, 1934	1,351,121	717,709

* * *

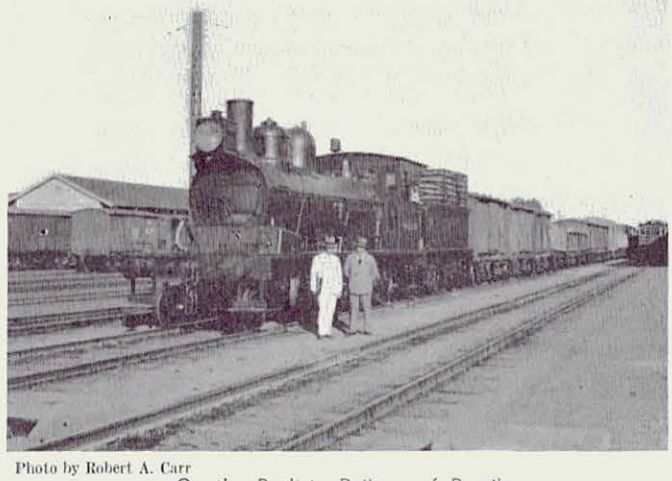
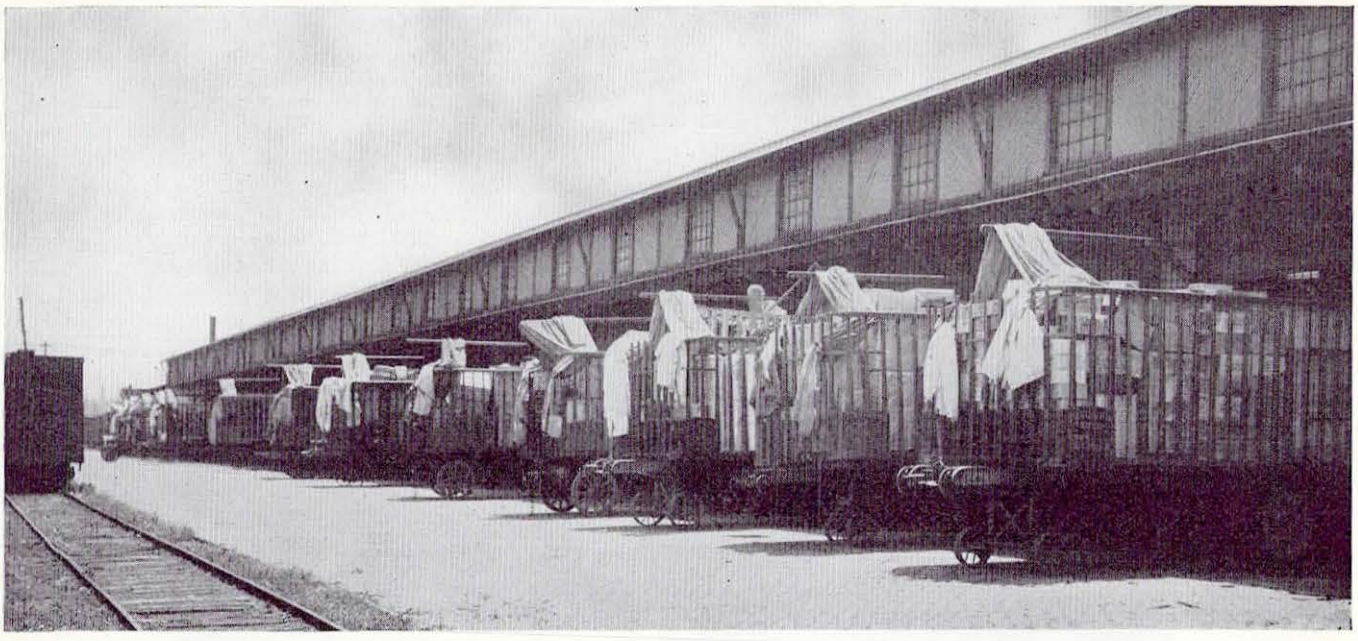


Photo by Robert A. Carr

On the Paulista Railway of Brazil

Motor Transport Section



A Columbia Terminals Trailer Set-up at One of the Railway Freight Stations

Avoiding Junction Delays to Merchandise

Columbia Terminals Company handles all L.C.L. interchange in St. Louis and East St. Louis

THE Columbia Terminals Company, as agent for all of the railroads serving St. Louis and East St. Louis, handles several million pounds of merchandise daily, speeding collection and delivery service and eliminating delays in interchange traffic. The handling of this large quantity of merchandise by motor truck also saves considerable switch engine and freight car mileage, and provides greater flexibility than could be attained by rail in these complicated terminals, particularly since all rail operations are rendered more complex by the Mississippi river dividing the two cities.

In addition to its transfer services, the Columbia Terminals Company also operates, as agent for all the railroads, a number of off-line stations for the receipt and delivery of freight. These stations, which are situated at strategic points throughout the industrial districts, enable the railways to dispense with many individual stations they would otherwise have to operate. For example, 13 railways serving the east bank of the river have no individual freighthouse facilities in St. Louis; yet neither the railways nor their St. Louis patrons suffer, since their traffic is conveniently and efficiently handled at the "universal" freighthouses of the Columbia Terminals Company.

Confronted with the barrier of the Mississippi river, the eastern lines built to East St. Louis, and the western lines to St. Louis, there being no rail connection between these two points until the Eads bridge was opened in 1874. Even after this connection was established, the rates on merchandise between eastern points and St. Louis were on a basis of two cents per 100 lb. more than to East St. Louis. To avoid this charge, and secure more expeditious movement of their traffic, St. Louis shippers and receivers teamed their merchandise between St. Louis and East St. Louis.

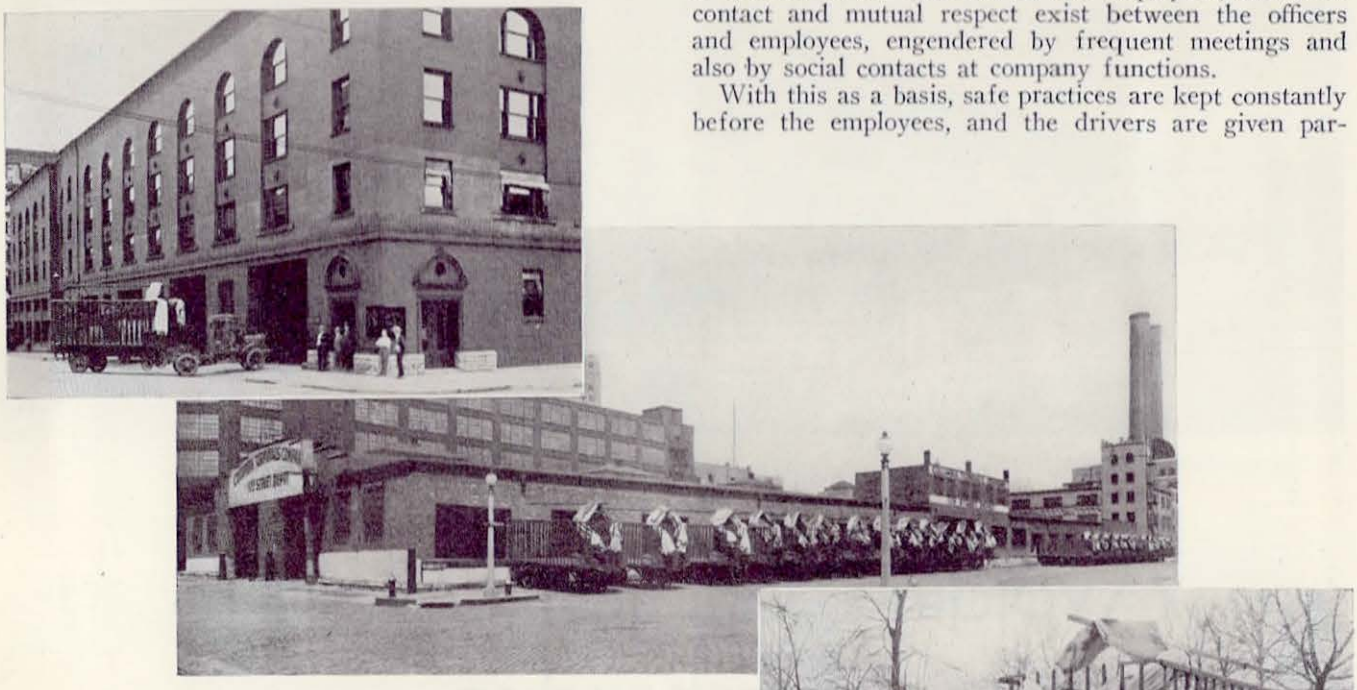
This situation existed until 1908, when the St. Louis and East St. Louis rates on l.c.l. traffic were made the same. However, the existing rail facilities in St. Louis were not then adequate to handle the traffic for actual rail delivery and it was impracticable, if not impossible, for the eastern lines to establish the necessary facilities on short notice. Accordingly, contracts were signed at that time with the Columbia Terminals Company, and several other companies since absorbed by Columbia, to handle the business by truck, and also to establish freight stations in which all roads had equal rights.

At first, the operations were conducted with horse-drawn vehicles. Later, the company motorized its equip-

ment, and, during each succeeding year of operation, its hauling methods have undergone a process of studied development.

The trucking company now serves between 30 and 40 of its own and railway freighthouses, and owns a fleet of motor equipment consisting of 177 trucks, 128 tractors, and 521 trailers. This total of 826 units of highway equipment supplies a regular and reserve fleet that is more than adequate to take care of any conceivable peak business.

Modern freight handling methods are the rule at the "universal" freight stations, and they are so operated as to move the freight with the greatest possible dispatch. All stations are of the "one dump" type, which permits



Type of Equipment and Station Facilities Owned by the Columbia Terminals Company

shippers to deliver or pick up, at any one location, freight for or from all roads utilizing the station.

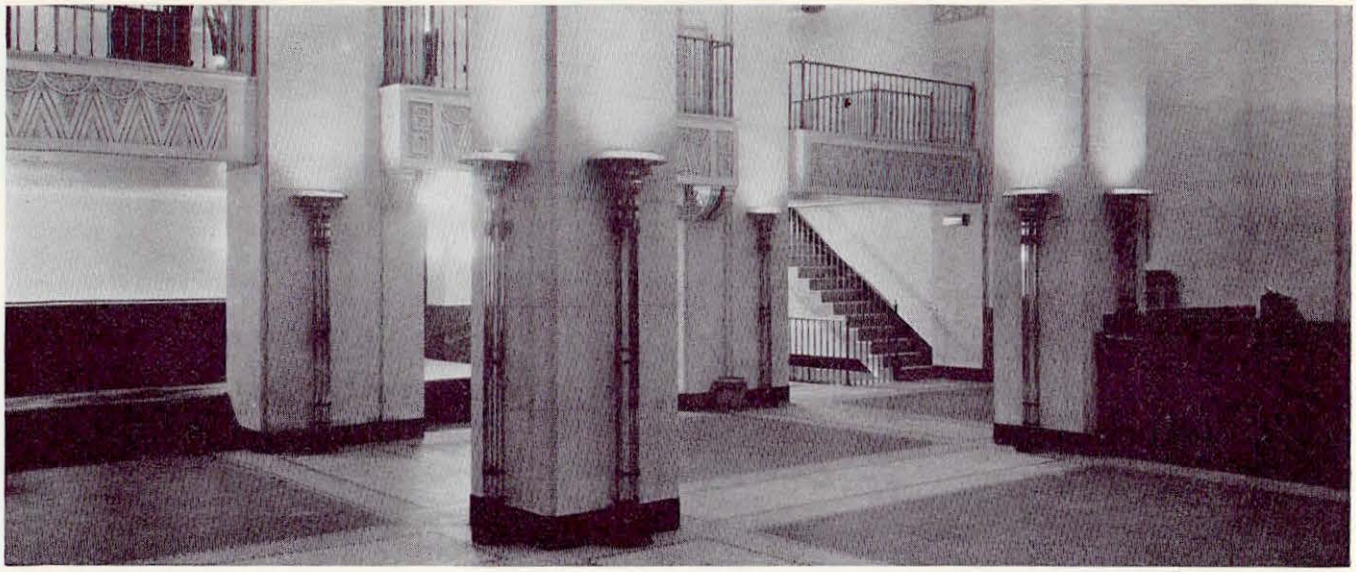
The use of the semi-trailers effects a large saving in time, and the entire operation has been built upon the principle that they should be loaded and unloaded "dead," that is to say, the tractor, during the loading and unloading of the trailers, should be engaged in the hauling of other semi-trailers under load. A check of operations showed that the average daily mileage of a motor truck, without trailer, in this service was not more than 20, and, at an average of 10 m.p.h., which is the limit that can be attained in the congested traffic districts where the trucks must operate, the unit was in actual productive service only 2 hr. daily, the other 6 hr. being spent in loading and unloading, or waiting for loading or unloading. Under the present system, one tractor is operated for each three semi-trailers, one semi-trailer being loaded, while another is being unloaded and the third in transit under load. Thus the tractor, which is more expensive to operate than the trailer, is kept in productive service, with its waste time reduced to the minimum.

Such efficiency is not attained, however, without careful supervision. The terminal area is divided into three districts, and a dispatching system on approved railroad lines has been set up, with a chief dispatcher and one dispatcher for each district. A private telephone communication system keeps these men in touch with the entire terminal picture and in frequent contact with the drivers. A file of cards, each representing a truck, is maintained in the dispatching office, and every move that is made is recorded thereon. A system of procuring advance information as to the amount of traffic to be moved from each of the various stations served has also been worked out, so that the equipment needs of each station may be anticipated, and all possible empty cross-haul of tractors and trailers eliminated.

Special and intelligent attention is given to the morale of the employees, as good morale is deemed the prime requisite to safe, efficient operation. A monthly magazine is devoted to the interests of the employees, and close contact and mutual respect exist between the officers and employees, engendered by frequent meetings and also by social contacts at company functions.

With this as a basis, safe practices are kept constantly before the employees, and the drivers are given particularly intensive training. These drivers are selected almost entirely from the ranks of the employees of the company, and an applicant for such a position must have a service record of at least one year with the company and pass a physical examination. He is then given a course, which begins with a study of the company rules and the principles of safe driving, followed by an examination on these subjects. The applicant then receives training in motor mechanism and the care and operation of equipment, followed by instructions as to the varying conditions met with in the handling of the company's motor units.

Having passed these tests successfully, the applicant takes actual driving lessons under a competent instructor, followed by a finishing course as assistant chauffeur. Careful training such as this has reduced accidents to the minimum, and helped to promote the efficiency with which the merchandise traffic of the St. Louis terminals is handled.



The Forty-Second Street Terminal of the Baltimore & Ohio is of Attractive Interior Design

Ten Years of Train Connection Service

Baltimore & Ohio celebrates anniversary of first rail-highway co-ordination of its kind

THIS month the Baltimore & Ohio is celebrating the completion of the tenth year of operation of its motor coach trainside terminal connection service between Jersey City, N. J., and New York. In this decade the 28 motor coaches in the Jersey City-New York-Brooklyn service have covered 1,750,000 miles, equivalent to 67 times around the world. Despite the hazards of New York City traffic, particularly during the winter, no serious accidents have occurred, and the coaches have been over 98 per cent on time in delivering passengers to their destinations. Since its inauguration, more than 2,500,000 passengers have been carried in this service.

When the Baltimore & Ohio was confronted with the problem of changing its passenger station status in New York City radically after having shared, by direction of the government, one of the huge centrally-located metropolitan terminals, and still offer the public a service that would be comparable with the service of competitors, much apprehension was felt as to the outcome. It meant returning to the old pre-war arrangement of operating trains to and from Jersey City.

Much study was given to this problem. Several plans were considered and the one finally decided upon was the present system used by the Baltimore & Ohio—a fleet of motor coaches to transport its passengers to and from the trainside to the heart of New York and Brooklyn. By the operation of this fleet of motor coaches (comfortably heated in winter) over convenient routes, with ticket offices, waiting rooms, baggage checking and other station facilities and conveniences at three well-known and frequented points in uptown New York and one in Brooklyn, the Baltimore & Ohio brought its passenger terminals in greater New York even closer and more accessible to its passengers.

One of the New York stations is located in the Chanin building on Forty-Second street, near Lexington avenue, directly opposite Grand Central terminal and the Commodore hotel, and with a direct subway connection with the Grand Central terminal. Other stations are maintained at 35 West Thirty-Third street, near the Empire State building, and at Columbus Circle at Central Park West. The Brooklyn station is located at 191 Joralemon street, in the Borough Hall district. Besides taking on

Trainside Transfer is Quickly and Easily Accomplished

Excellent Loading Facilities Are Provided at the Off-Line Stations

and letting off passengers at these four stations, the Baltimore & Ohio coaches make stops enroute at other points, including many leading hotels. Baltimore & Ohio passengers arriving at the Jersey City terminal step from the train into motor coaches standing in the train sheds alongside the tracks, and are transported to any of 14 places in New York and Brooklyn. Each coach seats 22 persons and is manned by a competent chauffeur, aided by a coach attendant who looks after the comfort of passengers and hand baggage. Hand baggage is checked on the train entering Jersey City and delivered to the passenger when he leaves the coach.

When departing from New York, travelers step into a Baltimore & Ohio coach at any convenient point, and are delivered alongside the train at Jersey City. Hand baggage checked at any coach station is delivered direct to the passenger on the train. The coaches connect with all Baltimore & Ohio trains arriving at and departing from Jersey City. The coaches operate on railroad schedules and connection between coach and train is assured. This terminal service is provided for Baltimore & Ohio passengers without any charge in addition to the regular fares.

Routes

The motor coaches operate over three distinct routes—one via the Twenty-Third street ferry, thence to Forty-Second Street station, with stops at the Governor Clinton, Pennsylvania, McAlpin and Vanderbilt hotels; another via the Twenty-Third street ferry to the Columbus Circle station, with stops at the New Yorker and Lincoln hotels; and a third route via Liberty street to the Forty-Second Street station, stopping at Wanamaker's, Fourth avenue and Ninth street. To Brooklyn, the route is via Liberty street and the Manhattan bridge to the motor coach station at 191 Joralemon street, stopping at the St. George hotel and The Towers.

A similar co-ordinated train-motor coach service is operated by the Baltimore & Ohio between the railroad station at Elizabeth, N. J., and Newark, a distance of approximately five miles. Under this system, Baltimore & Ohio motor coaches meet all trains upon arrival at Elizabeth and transport passengers and their hand baggage to the Broad Street station of the Central of New Jersey in Newark, with optional delivery at the Robert Treat hotel and the Public Service Terminal building. The same service is provided outbound, connections being made with all Baltimore & Ohio trains from Elizabeth to the south and west.

The experience of the Baltimore & Ohio in readjusting its terminal facilities at New York and Newark has demonstrated the practicability of utilizing the motor coach as a co-ordinated aid to steam railroad transportation. It permits unusual flexibility in the establishment of terminals, for coach lines can be extended or relocated to conform with changing traffic conditions. It is furthermore a more economical plan of operation for the railroad, and above all, it provides greater conveniences to the passenger at no extra cost.

* * *

California Bound Via National Trailways

"Wild-Cat" Ticket Selling Uneconomic

Bus industry needs the benefits of stable and reliable salesmanship

By Harold G. Hernly

Attorney, Railway Ticket Protective Bureau

Modern, Up-to-Date Ticket Offices Such as This Should Supplant the Hole-in-the-Wall Salesman of Former Days

OF the numerous questions of policy that are now confronting motor bus operators, there is one which has received little attention but yet is destined to be of vital importance insofar as the future efficient development of the industry is concerned. This problem involves the transportation ticket broker as applied to the interstate carriage of passengers.

Congress recognized the evils prevailing in the motor industry as regards the activities of ticket brokers, which were detrimental to the best interests of the business, by the enactment of the brokerage license section of the Motor Carrier Act—namely, section 211 (a), (b), (c) and (d).

There has been only one public expression of opinion as to the interpretation of sub-section (a), in Bulletin No. 3 of January 3, 1936, of the National Association of Motor Bus Operators.

"In view of the final proviso of Section 211 (a), it is apparent that no authorized agent of any motor carrier, whether such agent receives compensation on a salary or commission basis, can be considered a broker under this section or required to obtain a brokerage license. If a carrier contracts with an agent to sell his transportation and furnish tickets for that purpose, even though such agent is also agent for other motor carriers under the same arrangements the agent, in our opinion, is an authorized agent of the carrier and not required to obtain a brokerage license.

"In view of the first proviso of the section, it would appear that the only people authorized to become brokers are those who sell transportation through requisitions on different certificated carriers without having any specific agency arrangements with those carriers for the sale of tickets."

The Interstate Commerce Commission has recognized the uncertainty prevailing as to the clear interpretation of this section by virtue of the following notice released by Secretary McGinty on January 31, 1936, with reference to the alternate form for application for brokerage licenses (Form BMC B):

"It appears that many brokers of motor transportation have not filed application for licenses because of the uncertainty as to whether or not they are subject to the Motor Carrier Act of 1935, and the difficulty of securing some of the information and data required to complete Forms BMC 4 and 5 . . . "

Another Interpretation

The attention of the motor bus operators is directed to the fact that this brokerage section might be capable of another interpretation other than the one suggested in the bulletin referred to above.

The expansion of the bus business has been predicated upon a sales system that delegated the sale of transportation to any willing person on a commission basis, regardless of financial responsibility or character and fitness to act as a transportation agent. Notwithstanding this fact, the future welfare of the motor bus business is largely dependent upon the interpretation given to the particular section as regards brokers of motor bus transportation and the following argument is advanced in support of the contention that a "bona fide agent," as referred to in the last proviso of Section 211 (a), does not purport to be in reality an authorized agent of a carrier when he acts in the capacity as an independent transportation agent or broker for more than one certificated motor carrier.

The hypothetical broker that is being discussed under this section of the act is the usual individual who rents an establishment for the purpose of selling bus transportation on a commission basis for two or more certificated carriers, the rent, the advertising and all overhead expenses being assumed by the owner of the business.

Before the Motor Carrier Act was enacted, the principal motor carriers, because of their inability to control the activities of these brokers, suffered revenue losses as a result of such practices as the sale of wildcat transportation, splitting of commissions, sale of share-expense transportation and the scalping of railroad excursion tickets. Another problem which the carriers were unable to surmount, because of the lack of proper bonding requirements, was the inability to secure an adequate accounting from the brokers regularly for their transportation and lack of any legal recourse against such brokers who embezzled their funds or used their position to obtain money under false pretenses from prospective passengers.

Because of the ease with which any person could enter into the bus transportation brokerage business, every terminal city of any size has become overcrowded with brokers of questionable financial responsibility and moral character, and this condition continues under the present Act unless the Act be interpreted to include this type of broker.

What Is a "Bona Fide Agent?"

The term "bona fide agent," as used in the last proviso of Section 211 (a), must be construed in the generally

accepted legal meaning attached to such a term. It would not be feasible to lay down a hard and fast definition for this term because the ultimate decision characterizing a transportation agent as a "broker" or a "bona fide agent" will rest upon the facts and circumstances surrounding each case. It becomes important, therefore, to investigate some of the facts or circumstances that might influence a decision fixing the status of a transportation agent under the Motor Carrier Act of 1935.

The compensation of the agent is a factor to be considered but only becomes important when considered with other facts. Thus, if the agent is a direct or exclusive agent of a motor carrier, it is immaterial whether the agent is paid either a salary or commission. If the agent represents more than one carrier and is paid solely by commission, the presumption is not so strong as to agency relationship and other circumstances must be referred to to support the agency theory.

In connection with the latter, the question of compensation may become important or not, depending upon the method used by the motor carrier in paying the commission. If the carrier should sell transportation tickets outright to the agent at the tariff fare, less 10 per cent, as is done in many cases, the degree of control retained by the carrier over the agent becomes slight, and the situation is more like that of a broker. It is the exception rather than the rule to find a motor carrier placing tickets for sale with an agent collecting the full tariff rate and remitting the commission after an accounting. If this latter practice was followed, there would be a definite element of control of the principal over the agent in the orthodox manner and would be more indicative of a true agency relationship.

Another factor to be considered is the degree of control exercised by the principal motor carrier over the agent, exclusive of the question of compensation as to the actual conduct of his business. A majority of motor transportation brokers or agents own and operate their places of business as sole proprietor, associations of persons or partnerships. They pay the rent, own their own furnishings and do their own advertising. The traveling public who are attracted to the broker's place of business come as a result of private solicitation of the local broker. The broker, once contacted, becomes the agent of the passenger in placing the transportation request with any one of several motor carriers whom he represents. There is absolutely no control over the broker as to his recommendations, practices or policies as to routing passengers. His only limitation is that he must sell the transportation at the published tariff rate, no more, no less.

This question of the control of the principal carriers over the agent is of considerable importance, especially in the following instance:

If the prospective purchaser of a bus ticket should enter the premises of such an agent and is for any reason injured upon the premises, the injured person, if the agent is an authorized agent, could have recourse against any one of the principal carriers which the agent represents and collect damages from the most financially responsible carrier. However, if the agent is a broker and is considered as operating an individual brokerage business, the injured party's recourse would be solely against the proprietor of the business.

The scope of the agent's authority has been indirectly referred to above and is another factor in the establishment of an agency relationship. The broker is only empowered to speak for the carrier in the matter of the rates to be charged and the route followed, both covered by tariffs on file with the Interstate Commerce Commission. The broker is not a general agent in the generally accepted legal meaning but is given only the privilege of performing certain acts according to fixed instructions. These limitations are further indicative of a broker relationship and not of an agency status.

When all of these factors are considered, it is the opinion of the writer that a majority of the bus transportation agents now engaged in selling bus tickets for one or more interstate motor carriers will be found to be doing a brokerage business and therefore subject to Section 211 (a) of the Motor Carrier Act of 1935.

When the past history of the phenomenal rise of the motor bus industry is reviewed and the detrimental practices of such brokers as they then existed are taken into consideration, it is difficult to understand how the same broker who existed prior to the enactment of the act and who was the cause of all of the unethical and unbusinesslike practices that existed as regards the sale of motor bus transportation, should now be regarded under the Motor Carrier Act as an authorized agent and be exempt from the beneficient provisions of Section 211 (a), (b), and (d). It would appear that it would be more important to support that interpretation of the Act which would bring the question of the selection of interstate motor carrier brokers within the control of the Interstate Commerce Commission, in order to take advantage of the character and fitness, financial responsibility and bonding requirements therein provided.

If the interpretation contended for here should prevail, there is no doubt that the number of brokers would be reduced considerably, especially in the metropolitan areas. Whatever temporary loss of business might result from the reduction of the number of brokers now in business, would be more than compensated for by the immediate rise in the standard of the personnel remaining as licensed and bonded brokers of interstate motor carrier transportation.

New Haven's Centralized Control of Maintenance

CENTRALIZED control of equipment maintenance, insuring systematic attention to the condition of vehicles, has enabled the New York, New Haven & Hartford's highway subsidiaries to secure from their buses and trucks a maximum amount of service at a minimum cost. As pointed out briefly in the Motor Transport Section of the *Railway Age* of July 25, this maintenance plan involves the keeping in the parent railroad's statistics and research department of individual highway vehicle records upon which are entered daily the mileages made by the various units, as reported by cashiers throughout the bus and truck systems. Inspection and maintenance schedules have been scientifically worked out to require that certain specified inspections and repairs be made when a unit has run various specified mileages.

When the record shows that a vehicle has been operated a mileage calling for its submission to one of the scheduled maintenance routines, a form serving notice of this fact is forwarded to the proper mechanical officer. The latter, when the specified inspection routine has been covered, makes a notation to that effect on the same form, which he returns to the statistics and research department.

Five maintenance schedules have been worked out—

they are covered in turn when the vehicle has run 1,000 mi., 2,000 mi., 4,000 mi., 8,000 mi., and 16,000 mi. They are set up to cover "the principal features of preventive maintenance" but foremen are at the same time reminded of the impracticability of covering all items on various models. Thus they are expected to exercise initiative to correct any condition not covered.

The five schedules are as follows:

Schedule No. 1

(1000 miles—including daily inspection.)

1. Check and adjust brakes according to instructions. Take decelerometer reading and record above.
2. Check battery for water, do not fill too full and make sure battery is securely anchored.
3. Tighten all wheel nuts and rear axle flanges; replace broken studs.
4. Clean air filter element thoroughly and oil. Renew oil in reservoir if of oil bath type.
5. Check fan, generator, compressor belts. Adjust or renew if necessary.
6. 711 and 717 coaches inspect all hose connections between carburetor, compressor, valve cover and air cleaner.
7. Grease clutch throw-out bearing. Oil starter, generator, and turn down water pump grease cups.
8. Inflate all tires to recommended pressures.
9. Correct level of air bottles.
10. Check emergency door for operation.
11. Adjust clutch to proper clearance.

Schedule No. 2

(2000 miles—including Schedule No. 1.)

1. Grease thoroughly, omit wheel bearings and oil change. Oil radiator shutters.
2. Check oil level in transmission and differential. Replenish if necessary.
3. Clean and drain all oil filters. Change DeLuxe filter cartridge.
4. Check springs for broken leaves.

Schedule No. 4

(4000 miles—including Schedules Nos. 1 and 2.)

1. Spark plugs: Remove, clean, test and adjust gaps to .022 except Ford V-8 at .025.
2. Distributor: Clean, check and adjust or renew points, see instruction book. Check distributor head carefully for cracks. Check rotor brush.
3. Current control: Check and adjust voltage regulators, adjust voltage to 14.25.
4. Wiring: Check all wiring for broken insulation and connections, replace if necessary.
5. Filters: On all coaches not equipped with DeLuxe filters, drain and renew crank case oil.
6. Gaskets: Check intake and exhaust manifolds for cracks and blown gaskets. Tighten all nuts and bolts on manifolds. Check all exhaust line connections.
7. Steering: Check and correct wheel alignment if necessary. Check all steering connections for looseness. Check lost motion in steering wheel—must not exceed three (3) inches.
8. Sleeve valve: Clean exhaust ports, also hot spots on intake manifolds.
9. Booster brakes: Lubricate booster cylinder with engine oil. Lubricate application valve by soaking oil through vent holes in housing.
10. Hydraulic brakes: Check fluid in master cylinder and fill if necessary to correct level and with approved fluid.
11. Springs: Clean off with putty knife or wire brush and examine for broken leaves.
12. Shutters: Check for operation and oil joints of same.
13. Controls: Check all carburetor and timing control rods, clevises and ball and socket joints for wear and operation. Oil joints and make sure accelerator works freely. Check accelerator pull-back spring and make sure same is O.K.
14. Tools: Coaches carrying tools, check for jack—make sure jack works properly—jack handle, wheel wrench and crank, also axes where required. Check flare kits for operation also wicks of the same and make sure it is full of oil. Check fire extinguisher and fill if necessary.

Schedule No. 8

(8000 miles—including Schedules Nos. 1, 2 and 4.)

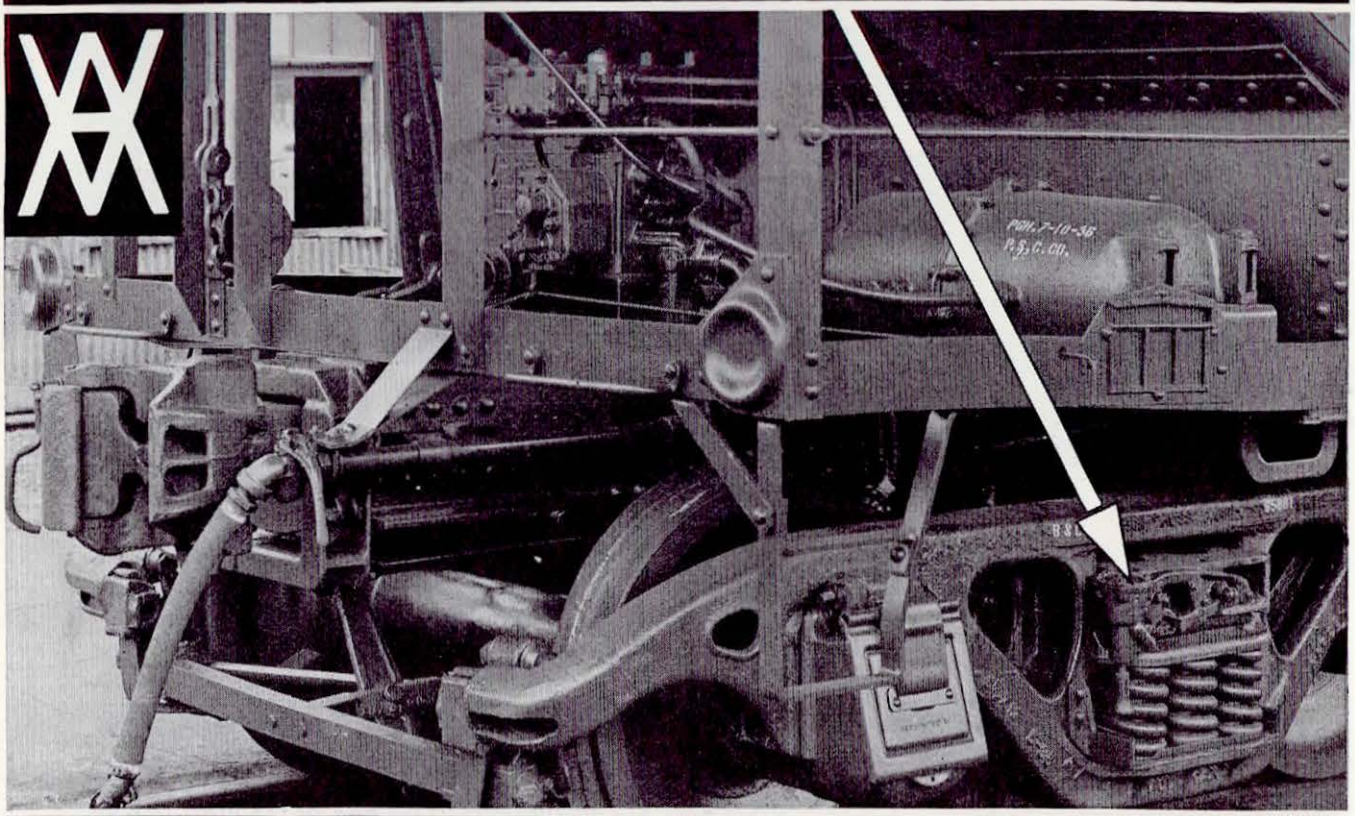
1. Clean engine thoroughly by approved methods, first disconnecting the battery and taking proper fire precautions. Clean core of radiator.
2. Check gasoline and oil consumption by referring to monthly record and if unsatisfactory take the necessary steps to correct.
3. Check engine compressor, if any weak cylinders take steps to correct.
4. Check fan shaft and bearings for adjustment. Examine fan for loose blades.
5. Check blacklash in timing chain or gears and adjust or replace if necessary.
6. Adjust valves to recommended clearance. Tighten all nuts on cylinder head and block.
7. Remove and clean oil outlet "T" and elbow and "T" connections at rear of rocker arm shaft on 711, 712 and 717's.
8. Check automatic choke for operation on 711, 712 and 717's.
9. Clean hot spots on coaches so equipped and make sure all heat controls are working properly.
10. Check air compressor head, pipes and connections for leaks. Clean air pipe from head to air tank. Make sure unloading valves in head are free.
11. Check air governor for leaks and remove filter hair from inlet fitting and clean.
12. Clean all fuel pump, vacuum tank, carburetor, gas tank, and gas line strainers.
13. Coaches equipped with oil coolers and when recommended, clean same by approved methods.
14. Test ignition coil and condenser, renew if found defective.
15. Replace distributor on Ford V-8 with service unit.
16. Check engine governor and adjust to recommended r.p.m. if necessary.
17. Check generator brushes for wear and see that brushes are free in guides. Check commutator and clean with sand paper if necessary.
18. On sleeve valve motors, remove hand hole plate and clean oil pump strainers.
19. On other type motors with removable oil pump or pump strainers, clean same.
20. Drain and renew crankcase oil.
21. Clean battery and connections and compartment or cradle by approved method. Paint with approved paint if necessary. Test battery voltage and gravity and replace with service unit if unsatisfactory.
22. Pull wheels and hubs on 712's and Fords. Clean and check bearings, cups, brakes, brakedrums. Check axles for fractures, also wheels. Repack bearings and hubs with approved grease.
23. Test B-4 valve for leakage and check for correct brake pressure with test gauge as per instruction.
24. Test all air and hydraulic lines, hose connections, brake chambers and air tanks and connections for leaks. Examine hose lines carefully for chaffing and deterioration and renew if found defective. Check air tank safety valve.
25. Check propellor shaft brake lining, drums or discs and replace if necessary.
26. Check backlash in drive line and if excessive make necessary corrections.
27. Check condition of amidship bearings and universal joints.
28. Check differential worm wheel or ring gear for wear through inspection hole. Check worm or pinion shaft for side and end play and adjust if necessary. Check transmission in same manner.
29. Check engine support mountings and tighten, if rubber mounted renew rubber grommets if necessary.
30. Tighten all body and chassis bolts and nuts, underneath. Also bolts and nuts on differential, transmission, drive line and universal joints. Clean off under side of body over universals.
31. Clean off grease and dirt from spring shackles and adjust. If rubber type, renew rubber bushings if necessary.
32. Clean, prime and adjust air bottles according to instructions. Coaches equipped with snubbers check for operation and fill with approved fluid if necessary.
33. Check all seats and make sure same are fastened securely and that cushions are in place. Check upholstering for tears, etc. Clean all plush upholstering and tighten seat grab handles.
34. Oil door engine, guides, and door hinges, wipe off surplus oil and grease. Check entrance, exit and emergency doors for operation and adjust if necessary.
35. Make sure hood sills are tight and replace or repair any missing or broken hold-downs.
36. Straighten bent bumpers and make sure same are anchored securely.
37. Clean and paint wheel surfaces showing, if necessary.
38. Make report on body repairs that should be done and which cannot be completed at this time.
39. Road test coach, correct any defects and make final adjustments.

Schedule No. 16

(16,000 miles—including Schedules Nos. 8, 4, 2 and 1.)

1. All coaches equipped with air compressors: Remove cylinder head, clean carbon and check valves. Check quick release valve.
2. All coaches: Pull wheels and hubs. Clean and check bear-

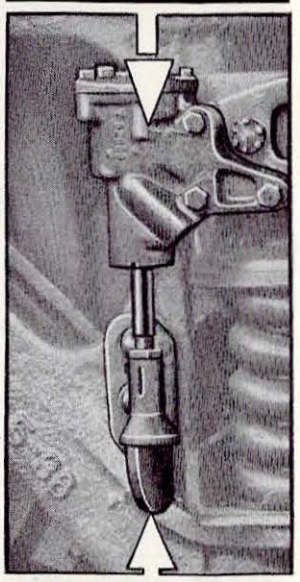
The Latest Development in AUTOMATIC



"AB" Type Empty and Load Brakes . . .

OUR latest development in equipment for the modern freight car having a high ratio of loaded to empty weight is the "AB" type Empty and Load Brake, which has a distinctive AUTOMATIC feature . . . A "strut cylinder" is mounted on a spring-supported member of the truck, and a piston stop attached to a non-spring-supported member . . . The allowable piston movement thus varies with the spring deflection as the car weight changes—which determines whether the equipment is set for empty or load operation . . . This mechanism is simple and accessible.

STRUT CYLINDER



PISTON STOP

WESTINGHOUSE AIR BRAKE COMPANY

General Office and Works . . . . . WILMERDING, PENNA.

they are covered in turn when the vehicle has run 1,000 mi., 2,000 mi., 4,000 mi., 8,000 mi., and 16,000 mi. They are set up to cover "the principal features of preventive maintenance" but foremen are at the same time reminded of the impracticability of covering all items on various models. Thus they are expected to exercise initiative to correct any condition not covered.

The five schedules are as follows:

Schedule No. 1

(1000 miles—including daily inspection.)

1. Check and adjust brakes according to instructions. Take decelerometer reading and record above.
2. Check battery for water, do not fill too full and make sure battery is securely anchored.
3. Tighten all wheel nuts and rear axle flanges; replace broken studs.
4. Clean air filter element thoroughly and oil. Renew oil in reservoir if of oil bath type.
5. Check fan, generator, compressor belts. Adjust or renew if necessary.
6. 711 and 717 coaches inspect all hose connections between carburetor, compressor, valve cover and air cleaner.
7. Grease clutch throw-out bearing. Oil starter, generator, and turn down water pump grease cups.
8. Inflate all tires to recommended pressures.
9. Correct level of air bottles.
10. Check emergency door for operation.
11. Adjust clutch to proper clearance.

Schedule No. 2

(2000 miles—including Schedule No. 1.)

1. Grease thoroughly, omit wheel bearings and oil change. Oil radiator shutters.
2. Check oil level in transmission and differential. Replenish if necessary.
3. Clean and drain all oil filters. Change DeLuxe filter cartridge.
4. Check springs for broken leaves.

Schedule No. 4

(4000 miles—including Schedules Nos. 1 and 2.)

1. Spark plugs: Remove, clean, test and adjust gaps to .022 except Ford V-8 at .025.
2. Distributor: Clean, check and adjust or renew points, see instruction book. Check distributor head carefully for cracks. Check rotor brush.
3. Current control: Check and adjust voltage regulators, adjust voltage to 14.25.
4. Wiring: Check all wiring for broken insulation and connections, replace if necessary.
5. Filters: On all coaches not equipped with DeLuxe filters, drain and renew crank case oil.
6. Gaskets: Check intake and exhaust manifolds for cracks and blown gaskets. Tighten all nuts and bolts on manifolds. Check all exhaust line connections.
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11. Check air governor for leaks and remove filter hair from inlet fitting and clean.
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13. Coaches equipped with oil coolers and when recommended, clean same by approved methods.
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17. Check generator brushes for wear and see that brushes are free in guides. Check commutator and clean with sand paper if necessary.
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35. Make sure hood sills are tight and replace or repair any missing or broken hold-downs.
36. Straighten bent bumpers and make sure same are anchored securely.
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Schedule No. 16

(16,000 miles—including Schedules Nos. 8, 4, 2 and 1.)

1. All coaches equipped with air compressors: Remove cylinder head, clean carbon and check valves. Check quick release valve.
2. All coaches: Pull wheels and hubs. Clean and check bear-

ings, cups, brakes, brakedrums, steering knuckles and king pins and tie rod ends. Check axles for fractures or breaks. Also check wheels for cracks and replace brake lining if necessary. Repack hubs with approved grease.

3. Remove starter and check. Clean commutator. Make sure brushes are O.K. and free in guides. Check flywheel ring gear and dress with file or replace if necessary.

C.G.W. Begins Truck Ferry Service

AFTER protracted hearings the Interstate Commerce Commission gave permission to the Chicago Great Western to handle highway trailers on flat cars between Chicago and the Twin Cities. The new service was started on July 7, and during the first full month in which the tariff was in effect, the railway handled 870 trailers under this arrangement. Of this total, 435 loaded trailers were hauled on 239 flat cars from Chicago to the Twin Cities, and 291 loaded and 144 empty trailers were hauled on 245 flat cars. On this business, the railroad received a gross revenue of $35,735, which was equal to $73.83 per flat car.

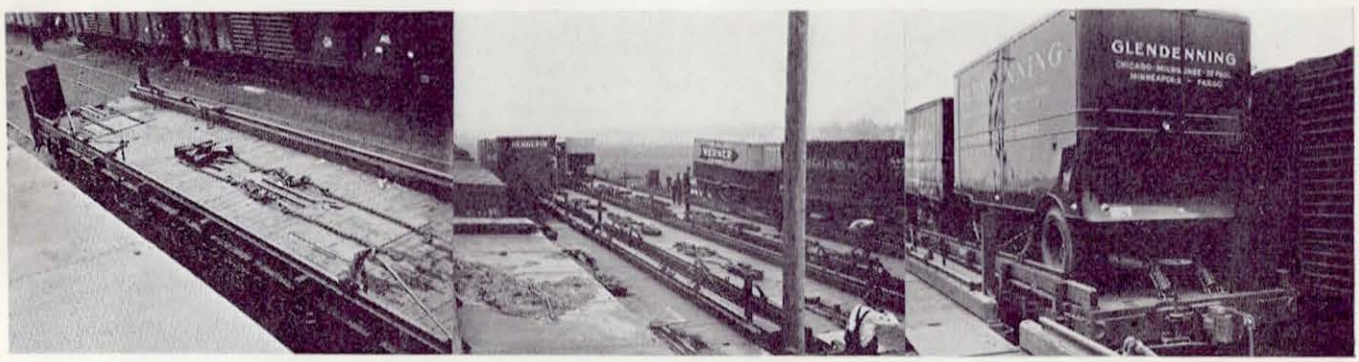
The tariff provides for a charge of $42.50 per trailer handled between Chicago and St. Paul, with an additional charge of $10 each for trailers exceeding 20,000 lb. A flat rate of $21.25 is charged for hauling an empty trailer. Each of the specially-equipped flat cars will carry two trailers.

This service is, of course, available under the tariff to all shippers and truck lines. So far it has been used by the Keeshin Motor Express, and by eight other truck lines which are members of the Illinois-Minnesota Motor Carriers Conference. The Keeshin company has ordered 100 new trailers from the Highway Trailers Company especially for this new service. The Chicago Great Western is planning to use the 100 new steel flat cars recently built by the Pullman-Standard Car Manufacturing Company in this service, and 40 of these cars have already been equipped.

A four-track ramp at Laramie and Taylor streets and a two-track ramp at 14th and Lumber streets in Chicago, and a four-track ramp at South Robert street and Plato avenue in St. Paul, have been constructed for this service. The loaded semi-trailers are backed up these ramps onto the flat cars by the tractors which haul them from the trucking company's freighthouses and are fastened down on the specially equipped cars for the road haul. On arrival at destination, the trailers are unfastened and hauled down the ramp by tractors.

Each of the flat cars is equipped with longitudinal members eight inches high which serve as sideboards to keep the trailer from being pushed over the sides of the car in the back-up operation. Once the trailer has been spotted, it is fastened safely and immovably in a few minutes by lever-operated devices. The side chains, each of which has turnbuckles and heavy springs, are hooked on to lugs on the trailers. Since the bodies used for freight loading are of the semi-trailer type, supported in front when not connected with the tractor by a small dolly wheel, which is often not too substantial, special provision had to be made for the front end for the rail haul. For this purpose a screw-top jack is hinged to the floor of the car and inserted under the front of each semi-trailer for support.

Drivers for the trucking company spot the trailers on the cars and unload them from the cars at destination, while C.G.W. employees fasten the trailers to the cars. None of the operations is difficult, although the backing of the trailers up the ramp and on to a car is found awkward at first by the drivers. However, after a few days practice this operation becomes simple, and the entire process of loading occupies but a short time. Only a few minutes are required for unloading.



Views Showing Loaded and Empty Flat Cars Used by the C. G. W. in Truck-Ferry Service

As stated previously, the method of handling the cars loaded with trailers is still in the experimental stage and the way that will be developed ultimately to make the road haul will depend upon a number of factors, including the volume of traffic offered. At present, the cars are being handled between Chicago and St. Paul on a schedule of 15 hr. in each direction.

Santa Fe Buys New Lines

THE highway subsidiaries of the Atchison, Topeka & Santa Fe are continuing to expand their activities, following the creation of a special bureau to handle rail-highway co-ordination, as previously announced. The Santa Fe Transportation Company has made application to purchase the operative rights of three Southern California truck lines. One is the Rex Transfer Company, operating between Los Angeles, Colton, San Bernardino, Redlands, Yucaipa and other points. The other two are the Kent Truck & Rigging Company and the Oceanside Truck & Transfer Company, which operate between Los Angeles and the steamship wharves along the Coast.

The Southern Kansas Stage Lines, another subsidiary, has applied to the Interstate Commerce Commission for authority to purchase the certificates of the Burton Truck Line, the property and certificate of the Hewitt Truck Line and the permit of the Harris Truck Line.

NEWS

U. S. Railroads Leaders in Fast Train Services

J. J. Pelley says increase in speeds during past five years is without parallel

The United States not only has the fastest trains for distances of 800 miles or more but has a greater number of trains with scheduled runs of 60 miles per hour or more than any other country in the world, according to a statement issued by J. J. Pelley, president of the Association of American Railroads. "The increase in this country in the past five years in the speed of trains operating on fast schedule is without parallel," said Mr. Pelley. "More than 400 trains covering in excess of 19,000 miles at the beginning of this year operated on scheduled runs timed at 60 miles an hour or better, compared with 30 regular runs operating for a total distance of 1,100 miles in 1930. The fact that many of these trains operate daily over long distances and with very few failures to maintain their schedules constitutes for the railroads of this country one of the greatest achievements of recent years. To operate at an average of 60 miles and over, it is necessary for trains to run at considerably higher speeds owing to stops that must be made at intermediate points."

By the increase in the speed of various trains operating between Chicago and the Pacific Coast, those runs are now made in approximately 21 hours less time than in 1930. Between Chicago and St. Paul there has been a saving due to increases in speed of nearly four hours, while between New York and St. Louis the running time of trains has been reduced by nearly two hours compared with 1930. Reductions in the schedules have also been made between New York and Chicago, New York and Washington, Chicago and New Orleans, New York and Miami, and scores of other cities including St. Louis and various points in Texas.

Remarkable reductions have also been made in the running time of freight trains, some operating today on virtually passenger train schedules. Overnight delivery of freight from points as far away as from 400 to nearly 500 miles is common in many localities. Some of these trains operate from one terminal to another at an average speed as high as approximately 43 miles per hour, including time occupied at intermediate terminals and in switching enroute.

N. C. & St. L. Soil-Improvement Car

A "soil improvement car" operated jointly by the Nashville, Chattanooga & St. Louis and the Agricultural Extension Service of the University of Tennessee has been making a tour of N. C. & St. L. lines during the past two weeks. All counties in Tennessee served by the N. C. & St. L. were visited where sufficient interest was manifested by the farmers and other interested parties.

The car is a rolling laboratory equipped to test thousands of samples of soil for lime and phosphate needs each day. Those in charge offer advice to farmers regarding the need of lime and phosphate on their lands and make recommendations concerning the amount, etc., as indicated by the tests made.

Streamlined Electric Train for Italian Railroads

Experiments with a new type of streamlined electric articulated train are being made in Italy, according to reports received by the United States Commerce Department. The train is composed of three air-conditioned cars articulated and resting upon four trucks of two pairs of wheels each. Its overall length is 203 ft. and its maximum width is about 9½ ft. Power is obtained from the overhead wires through one pantograph directly above the motors. The framework of the cars is made of tubular steel and all fixed joints are electrically welded. The interior is divided into first and second class compartments with a total capacity of 94 passengers.

Drought Rates in Canada

The Canadian Pacific and Canadian National have granted one-third reductions in freight rates on cattle and feed as a relief measure to farmers and ranchers in the drought-stricken sections of southern Alberta, it was announced in Edmonton, Alta., by Hon. W. N. Chant, Alberta Minister of Agriculture. Mr. Chant said the freight reductions were contingent upon the Dominion and provincial governments assuming the other two-thirds.

Status of Grade Crossing Program

The Bureau of Public Roads has issued a statement of the status of the United States work program grade crossing projects as of July 31 showing 158 projects completed, at a cost of $5,842,169; 1,233 under construction, at an estimated cost of $101,013,711; and 927 approved for construction, at an estimated cost of $35,304,665.

Motor Carrier Insurance Requirements Prescribed

Interstate Commerce Commission sets up regulations for companies subject to its jurisdiction

Division 5 of the Interstate Commerce Commission on August 15 issued a report and order prescribing a series of rules and regulations governing the filing and approval of surety bonds, policies of insurance, qualifications as a self-insurer or other securities or agreements for the protection of the public to apply to motor carriers subject to the motor carrier act. The regulations prescribed are somewhat easier than those proposed by the Bureau of Motor Carriers which had been made the subject of hearings and the commission indicates that in some particulars the requirements may be increased later as conditions warrant, saying: "We are unanimous in believing that higher limits of liability are desirable. Practical considerations prevent us, for the present, from prescribing such higher limits. One of these features is the expense which will be imposed upon the carriers for the insurance premiums. After a period of operation under regulation it is to be anticipated that a more stable condition in the industry will follow, which will enable the motor vehicle operators to purchase insurance for higher limits without undue burden." The report observes that the liability limits required are comparable to those imposed in a large majority of states. The findings and conclusions are as follows:

1. Reasonable minimum amounts of insurance for bodily injury or death on each motor vehicle transporting passengers are and will be as follows: For one person, $5,000; subject to that limit per person, for all persons in any one accident where the seating capacity is 7 passengers or less, $15,000; 8 to 12 passengers, inclusive, $20,000; 13 to 20 passengers, inclusive, $30,000; 21 to 30 passengers, inclusive, $40,000; and 31 passengers, or more, $50,000; and for property damage, $1,000.

2. Reasonable minimum amounts of insurance on each motor vehicle transporting property for bodily injury or death are and will be: For one person, $5,000; subject to that limit per person, for all persons in any one accident, $10,000; and for property damage, $1,000.

3. A reasonable minimum amount of insurance to cover loss or damage to property belonging to shippers or consignees

and coming into the possession of such carrier in connection with its transportation service is and will be: For the loss or damage to property carried on any one motor vehicle, $1,000; for loss of or damage to or aggregate of losses or damages of or to property occurring at any one time and place, $2,000.

4. A reasonable minimum amount of protection as a condition to the issuance of a broker's license is and will be a bond or other security in the sum of $5,000.

5. Each certificate or policy of insurance or surety bond with corporate or individual sureties filed with us for approval must be for not less than the full limits of liability prescribed by us; and in each case in which surety on any bond is a surety company, such company must be one approved by the United States Treasury Department under the laws of the United States and the applicable rules and regulations governing bonding companies.

6. Upon this record, no set rules governing the qualifications for self-insurers can be established and for the present we will receive and consider for approval the application of any motor carrier which can establish to our satisfaction its ability to satisfy its obligations for bodily injury liability, property damage, or cargo liability without affecting the stability or permanency of its business; and we will also consider applications for approval of securities or other agreements other than surety bonds, policies of insurance, or qualifications as a self-insurer.

7. In order to afford reasonable security for the protection of the public, endorsements for policies of insurance, surety bonds, certificates of insurance and applications to qualify as a self-insurer and notices of cancellation must be in the forms prescribed and approved by this Commission.

8. In order to afford reasonable security for the protection of the public, all policies of insurance as amended by endorsements must be written by insurance companies legally authorized to transact business in each State in which their policies cover the operations of the insured motor carrier.

9. In order to afford reasonable security for the protection of the public no surety bond, policy of insurance, endorsement or certificate of insurance or other securities and agreements shall be canceled or withdrawn until after thirty days' notice to this Commission.

Commissioner Caskie, concurring in part, expressed the opinion that the insurance limits should have been placed at higher figures. He said that the amounts of insurance required by the majority as to cargo are substantially less than those recommended by the American Trucking Associations and will not, in his opinion, afford adequate security for the protection of shippers. The effect, he said, will be to impose upon the shippers in many instances the duty of carrying their own insurance.

July Revenues Show Large Increases

An increase of 19.4 per cent in passenger revenues for July as compared with those for July, 1935, is shown by 36 of the 53 Class I railroads in the eastern district in a summary of estimates submitted by the railroads made public by the Interstate Commerce Commission on August 14. The same roads showed an increase of 27.9 per cent in freight revenues. Three of the 4 Pocahontas region roads showed an increase of 38.4 per cent in passenger revenues and an increase of 29.1 per cent in freight revenues. In the southern region 22 out of 28 roads reported an increase of 22.7 in freight revenues and 29 per cent in passenger revenues, while 41 out of 59 roads in the Western district reported an increase of 27.4 per cent in freight revenues and 30.8 per cent in passenger revenues. For the six months ended June 30 the roads as a whole showed an increase of 15.6 per cent in freight revenues and an increase of 12.6 per cent in passenger revenues.

Correction

The item entitled "A Union Employee's Interest in Railroad Prosperity" which appeared in last week's *Railway Age*, page 237, was an excerpt from an article by W. B. Gatchell, which appeared in the B. of L. F. & E. Magazine. Last week's issue was in error in crediting the excerpt to the "B. of L. E. Magazine."

Last District Office of Bureau of Motor Carriers Opened

The Bureau of Motor Carriers of the Interstate Commerce Commission announced the opening of the last of its 16 district offices in the field on August 17, District No. 3, Philadelphia, Pa., with District Director H. R. Stickel in charge.

Illinois Assessments Four Per Cent Less

Assessments on railroad properties in Illinois have been fixed at $415,791,119 compared with $433,950,367 for last year, the average decrease in the valuation being 4.18 per cent, one of the smallest declines since 1930. Of the 80 railroad companies assessed for taxation, valuations were increased on 39 roads, while 41 carriers received reductions. During the year two small railroad companies ceased operation, and such property as they now have will be assessed in the future by local officers.

Trespassing Still a Serious Problem

Illegal train riders and trespassers removed from trains, but not arrested, in June, this year, numbered 440,490, a decrease of 194,817, or 30 per cent, compared with the corresponding month last year when there were 635,307, the Association of American Railroads announces. In the months of April, May and June, this year, 1,076,654 persons were either removed from trains, prevented from getting on trains or ejected from railroad premises by police and other authorities. These figures emphasize that despite the sharp falling off in the number of illegal train riders in June, this year, compared with the number a year ago, the total number of those who still refuse to heed railroad warnings as to the hazards of trespassing is of such proportions as to constitute a serious safety problem. In the first five months of 1936, reports filed by the railroads with the Interstate Commerce Commission show that 668 trespassers were killed, an increase of 10 compared with the corresponding period in 1935. For the calendar year 1935, there were 2,643 persons killed by being struck by trains or from other causes while trespassing on railroad property.

Keeshin Rail-Motor Tariff Again Suspended

The Interstate Commerce Commission has further suspended until December 5 the operation of tariff schedules filed by the Keeshin Motor Express Company, Inc., proposing to establish joint rail and motor rates on freight in trucks, trailers, and semi-trailers between eastern and western points in connection with the Chicago Great Western, the Clinton, Davenport & Muscatine, and various motor truck lines. The tariff was originally suspended on June 5 until September 6 but the commission has not yet been able to complete its investigation.

R. E. A. Inaugurates Air-Express Shopping Service

"Air-shopping," an air express service bringing to women in all parts of the country rare foods and flowers and the latest fashions, within a maximum of a few hours, is the latest feature of commercial aviation. The new service, requiring only an order by telephone to the Order department of Railway Express Agency, is designed to enable the housewife and hostess to place upon her table within a few hours foods and flowers flown from their sources in Canada, the United States and Central America.

"Fruits ordered direct from Flordia," the statement says, "will appear upon the breakfast table the next morning. Centennial roses ordered from Texas in the morning may appear upon the dinner table the same night. And a Paris model, ordered from Fifth Avenue one day, will be worn in Seattle the next."

Additional Drought-Relief Rates Authorized

The Interstate Commerce Commission, through Commissioner Aitchison, has issued an additional drought-relief order authorizing carriers participating in a tariff published by J. R. Peel as agent to establish reduced rates for the transportation of cattle from points in the drought stricken areas in Kansas and Oklahoma to all available feeding points in Texas. In another order the Union Pacific was authorized to establish reduced rates from points in Montana and North Dakota to feeding points on its line in Montana and Idaho.

New Haven's July Passenger Revenues Up 15 Per Cent

Trustees of The New York, New Haven & Hartford announced on August 20 that gross passenger revenues of that road for July were 15 per cent greater than in July, 1935. "This marked improvement," the statement says, "as compared with an increase of only 1½ per cent in June,

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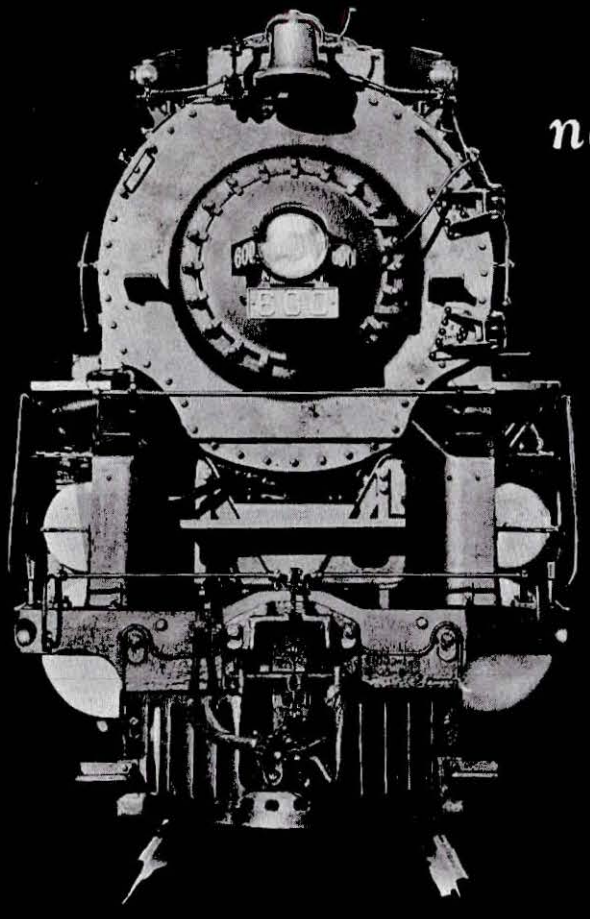
MODERN POWER

costs less to operate

increases net earnings



If modern power merely moved trains faster so more trains could use the rails, its purchase, in many cases, would be more than justified . . . However, in addition modern power moves bigger trains at lower ton-mile costs and also shows a surprising saving in locomotive maintenance . . . Modern Power increases railroad net earnings.

LIMA LOCOMOTIVE WORKS INCORPORATED, LIMA, OHIO

LIMA LOCOMOTIVE WORKS INCORPORATED

1936, over June, 1935, is particularly gratifying."

The above percentage increase in gross passenger revenues does not allow for added expense incident to handling the added traffic. Part of the increase was attributed to the July 4 holiday, normally a heavy traffic period for the New Haven, which fell on Thursday in 1935, but in 1936 fell on Saturday extending the holiday period.

The Trustees stated that including all classes of riding the number of passengers carried in July, 1936, increased 13.4 per cent, and the passengers carried one mile increased 30 per cent—both compared with July a year ago. Excluding commutation and similar low fare travel in July, the number of passengers carried increased 78 per cent, with an increase in passengers carried one mile of 57.6 per cent. For the first five months of 1936—prior to the introduction of the low fares—the New Haven's passenger revenue percentage increase was 10 per cent over the previous year.

Printing Exhibit Train

The American Type Founders, with 14 co-operative companies, is sponsoring an exhibition train—the Printers Progress Special—which will leave Grand Central Terminal, New York, on September 14 for a 100-days' tour of 71 cities. The train will consist of four cars, three exhibition cars and another which will be used as offices and living quarters for the crew of 14. The cars will be painted red, white and blue with aluminum tops. The exhibit will consist of a practical printing plant with all accessories demonstrating the case history of a printing job from manuscript to finished article.

Another "Off-the-Beaten-Track" Excursion on P. R. R.

Popular demand for another "off-the-beaten-track" excursion has prompted the Pennsylvania to arrange for the operation of such an excursion on next Sunday, August 23. The special train will leave from Broad Street station, Philadelphia, Pa., and use the P. R. R. main line to Downingtown. Here it will be shunted to the New Holland branch, which traverses the Welsh Mountain district, thence through Lancaster County, and on northward to Harrisburg, where a stop will be made long enough to walk the short distance to the State capitol. Leaving Harrisburg the train will cross the Susquehanna over the Rockville bridge, the longest stone arch bridge in the world, to Enola, where another stop will be made for a few minutes in the freight yards of the Pennsylvania. For the next one hundred miles the route laid out for the excursionists will follow the Susquehanna river, passing the power dams at Safe Harbor, Holtwood, and Conowingo, where a short stop will be made.

The return route is by way of the Octoraro branch, first through farming country, then through rolling hills, crossing the Brandywine and Chester creeks, to the Philadelphia suburban territory. The entire trip will be approximately 300 mi. long. Including the special stops, scheduled for the convenience of the passengers who desire to make pictures, or to view the scenery from strategic points enroute, it will consume practically 12 hrs. The train will leave Philadelphia at 8:30 a.m., and return at 8:15 p.m., daylight time.

One-Hundredth Anniversary of Lobdell Car Wheel Company

The Lobdell Car Wheel Company of Wilmington, Del., is this year celebrating the 100th anniversary of its operation under the leadership of the Lobdell family. It was in the summer of 1836 that George G. Lobdell, Sr., then 18 years of age, was placed in charge of the foundry and machine shops for the car wheel manufacturing firm of Bonney & Bush in which his uncle, Jonathan Bonney, was a partner.

This partnership was established in 1830 after Mr. Bonney, an experienced iron founder, had previously been in the business as an individual. When Mr. Bonney died in 1838 his interest in the partnership passed to Mr. Lobdell and the firm continued under the name of Bush & Lobdell until 1859. In that year Mr. Lobdell acquired from the heirs the interest of Mr. Bush, who had died in 1855. He continued to operate under his own name until 1867, when the business was incorporated under the name of the Lobdell Car Wheel Tire & Machine Company, with Mr. Lobdell as president and William W. Lobdell, his elder son, as secretary. The corporate title of the company was shortened to Lobdell Car Wheel Company, its present form, in 1871.

George G. Lobdell, Sr., died in 1894 at the age of 77 years and his son, William W. Lobdell, succeeded to the presidency. The latter died in 1914 and was succeeded in the presidency by his brother, George G. Lobdell, Jr., who, in his 86th year, continues to hold that position. In appreciation of the Lobdell centennial, the Association of Manufacturers of Chilled Car Wheels held its annual meeting at Wilmington last May and presented to the company an appropriately engraved resolution.

New York Central Plans Second "Railroad Wonder Trip"

In response to popular demand, the New York Central is planning to operate on September 20 a second "Railroad Wonder Trip," similar to that operated on November 17, 1935, to its West Albany (N. Y.) shops. This year's train will run from Weehawken, N. J., over the West Shore to Kingston, N. Y., and the Catskill Mountain branch to Oneonta, thence via the Delaware & Hudson into Albany, and New York Central Hudson division to Grand Central Terminal, New York. Ample time will be allowed for railroad and scenic enthusiasts to make all the photographs they desire.

A display of all available types of locomotives of the New York Central and New York, Ontario & Western will be arranged in Weehawken station for 1½ hrs. prior to the departure of the train. On the way through the Catskills, a stop will be made at Arkville, where the Delaware & Northern has arranged to display for inspection a 4-4-0 type locomotive. At Oneonta, the train will be delivered to the Delaware & Hudson and will move to the Oneonta shops and round houses of the D. & H., where inspection of locomotives as well as shops and yards will be had under guidance for almost two hours. From Oneonta, the train will continue through mountain country to Albany, where it will return to the N. Y. C. for the journey back to New York.

The train will consist of coaches, a dining car serving table d'hote meals at low prices, and a Pullman observation car. The Railway & Locomotive Historical Society, the Railroad Enthusiasts, Inc., and the International Engine Picture Club have co-operated with the New York Central and Delaware & Hudson in the planning of this trip. Reservations may be made at New York Central ticket offices or passenger department.

Contract-Carrier Permit Proposed for Scott Bros., Inc.

Joint Board No. 3 appointed by the Interstate Commerce Commission has submitted a proposed report recommending that the commission issue a certificate to Scott Bros., Inc., an affiliate of the Pennsylvania, authorizing operation as a contract carrier of commodities generally in collection and delivery service for the Pennsylvania and the Long Island in the metropolitan areas of New York and Jersey City in substitution for six independent truckers who have been performing the collection and delivery service in that area under contracts with these railroads since various dates in 1933 and 1934. The expressed aim was to place all of this service under one management and effect a more efficient co-ordination of rail and motor service.

At the hearing four trucking associations intervened and introduced testimony in protest against the granting of the permit. "Under the law," the report says, "the railroad has the right to choose a single and exclusive agent for the performance of this terminal transportation, particularly since, as a mere terminal facility, the proposed plan will not restrain in any presently conceivable manner the flow of commerce to, from, or through the New York metropolitan district. Thus, it appears that the plans of these railroads to attain a flexible and advantageous co-ordination of truck and rail service in the New York city area are in harmony with the expressed views of the Congress and of the commission, are consistent with the public interest, will expedite traffic movement at reduced cost, and apparently will not unduly restrain competition, even if the application be considered in the light of the provisions of section 213(a)(1), as urged by one protestant, as well as under the provisions of section 209.

Western Lines Extend Winter Excursions

Low excursion fares for winter travel to and from the Pacific coast will be established again this year by the Western railroads, for the period from October 1 to May 14. First-class tickets will be on a basis of two cents per mile with a 30

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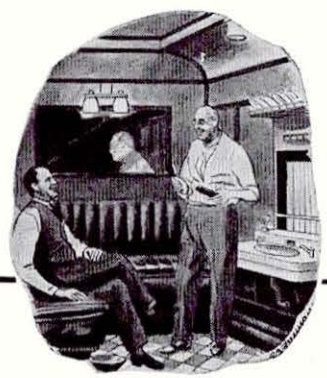
"Fresh as a daisy!"

[THANKS TO THE BOOSTER]



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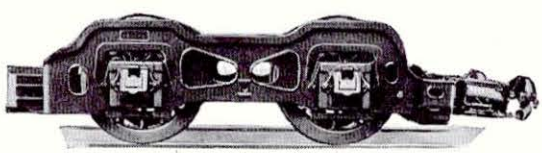

FRANKLIN RAILWAY SUPPLY CO., INC.

NEW YORK
CHICAGO
MONTREAL

day limit, tourist sleeping car tickets at the rate of 1.8 cents per mile, and coach tickets at the rate of 1.35 cents per mile, both with a return limit of six months. Last year the Western lines in November authorized round trip fares from all points to the Pacific coast at a rate of approximately 1.35 cents per mile in each direction for coach tickets and 1.8 cents per mile for intermediate class tickets good in tourist sleepers. In addition, round trip vacation rates were made effective from December 1 to February 15 at two cents a mile, good in all classes of equipment, and with a three weeks return limit.

As a result of the low fares established last winter, travel to and from the Pacific coast showed a 50 per cent increase, more people taking winter vacations than in any of the previous years. A study of vacation travel during the winter months shows that large corporations are balancing vacation time where employees show a preference for a rest period other than during the mid-summer months. Married employees who have no children frequently would rather take their vacations during the winter season than during the summer months.

During the first 75 days of the low fares for Pacific coast travel for the summer period, an increase of 43 per cent was registered over 1935, the total number of travelers by train approximating the business of 1930.

Hudson & Manhattan Files Suit Against Railway Labor Act

The Hudson & Manhattan last week filed bills of complaint in the federal district courts for New York and New Jersey asking injunctions from attempts by United States attorneys to enforce against it the provisions of the Railway Labor Act. The complaint, challenging the recent finding of the Interstate Commerce Commission to the effect that the H. & M. is not entitled to the exemption from the Labor Act which is provided for interurban electric railways, alleges that the road is an interurban electric railway, is not a part of a general system of steam railroad transportation, and, accordingly, that the decision of the I. C. C. is erroneous and should be overturned by the courts. The bill also challenges the constitutionality of the Labor Act, particularly in regard to the heavy criminal penalties imposed for failure to comply with it, which the bill states cannot be constitutionally applied to the H. & M. until after hearing in court as to the correctness of the I. C. C. decision.

Walter F. Brown, chairman of the Hudson & Manhattan's board, said in connection with the suit that "the Hudson tunnels have always been operated on the assumption that they constitute an interurban electric railway. As we have filed reports with the Interstate Commerce Commission on this basis for years, the recent decision of the commission came to us as a complete surprise.

"The statute provides expressly for the exclusion of interurban electric railways, unless they are operated as parts of a general system of steam railroad transportation. Our business is exclusively a passenger business between cities in the metropolitan district, except only that we carry a small amount of United States mail, as do many interurbans. Upon the basis of the facts, as to which there is no dispute, we are wholly unable to understand how the commission reached the conclusion that we should be classified as a general trunk line steam railroad rather than as an interurban electric line. As a matter of fact, all of our activities are similar to those of the subway systems serving the metropolitan district."

Equipment and Supplies

LOCOMOTIVES

The Birmingham Southern is inquiring for 10 Diesel-electric locomotives.

The Carnegie-Illinois Steel Corporation is inquiring for one 0-4-0 type switching locomotive.

The Conemaugh & Black Lick has ordered two switching locomotives of the 0-8-0 type from the American Locomotive Company. These locomotives will have 25-in. by 28-in. cylinders and a total weight in working order of 231,000 lb.

The Mexican National Construction Company has ordered two articulated locomotives of the 2-6-6-2 type from the American Locomotive Company. These locomotives will have 15-in. by 22-in. cylinders and will weigh 216,000 lb. in working order.

The Monessen Southwestern (Pittsburgh Steel Company), reported in the *Railway Age* of July 11 as inquiring for one 0-6-0 switching locomotive, has ordered this equipment from the American Locomotive Company. This locomotive will have 22-in. by 28-in. cylinders and a total weight in working order of 181,000 lb.

FREIGHT CARS

The Youngstown & Northern has ordered 100 all-steel gondola cars of 70 tons' capacity from the Greenville Steel Car Company.

The United Fruit Company, New York, recently bought in Germany 150 all-steel banana cars of 12 tons' capacity and 36-in. gauge.

The Birmingham Southern has ordered 100 box cars and 25 gondola cars from the Pullman-Standard Car Manufacturing Company.

The Missouri Pacific has asked Federal Judge Charles B. Davis, St. Louis, Mo., for authority to equip 150 additional freight cars with automobile loading devices and modernize such equipment on 208 other box cars, at an estimated cost of $180,850. It is contended by the company that some of its cars are not adapted to loading 1937 model automobiles in Detroit and that the proposed improvements are necessary to meet competition.

PASSENGER CARS

The State Railways of Uruguay have ordered three rail motor cars from the American Car & Foundry Company. A. Marques is locomotive superintendent, the offices of the company are at Avda, 18 de Julio 1546, Montevideo.

IRON & STEEL

The New York, Chicago & St. Louis has placed an order for 5,800 tons of 112-lb. rails with the Bethlehem Steel Company, the Carnegie-Illinois Steel Company and the Inland Steel Company.

Construction

Chicago & North Western.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the installation of approximately five miles of water line between Austin boulevard, Chicago, and Proviso yard, consisting of 14-in. Transite pipe, at a cost of approximately $260,000. Contracts have also been awarded to the Jutton-Kelly Company, Milwaukee, Wis., for the construction of two reinforced concrete and steel highway subways where this company's tracks intersect Silver Spring road and North Port Washington road near Milwaukee.

Chicago, Milwaukee, St. Paul & Pacific.—This company is now engaged in renewing two deck plate-girder viaducts on its Kansas City division near Moravia, Iowa. The old structures, which are 960 ft. and 574 ft. long, consist of deck plate-girder spans carried on structural steel towers which are supported on stone masonry pedestals. The new viaducts, which are to be approximately the same length as those replaced, are to be of somewhat similar construction with a heavier design loading and with tower pedestals of reinforced concrete on pile foundations. The concrete substructures are being constructed under contract by the M. M. Moen Company, Mason City, Iowa, and the Stark Construction Company, Cedar Rapids, Iowa, while contracts for fabricating the superstructures have been awarded to the American Bridge Company and the McClintic-Marshall Company. The combined estimated cost of the new structures is approximately $250,000.

Staten Island Rapid Transit Railway Company.—This Baltimore & Ohio subsidiary will open bids at 11 a.m. Eastern Standard Time, August 25, at the chief engineer's office, Baltimore, Md., for work in connection with the elimination of grade crossings at Port Richmond and Tower Hill, Staten Island, N. Y.

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"Fresh as a daisy!"

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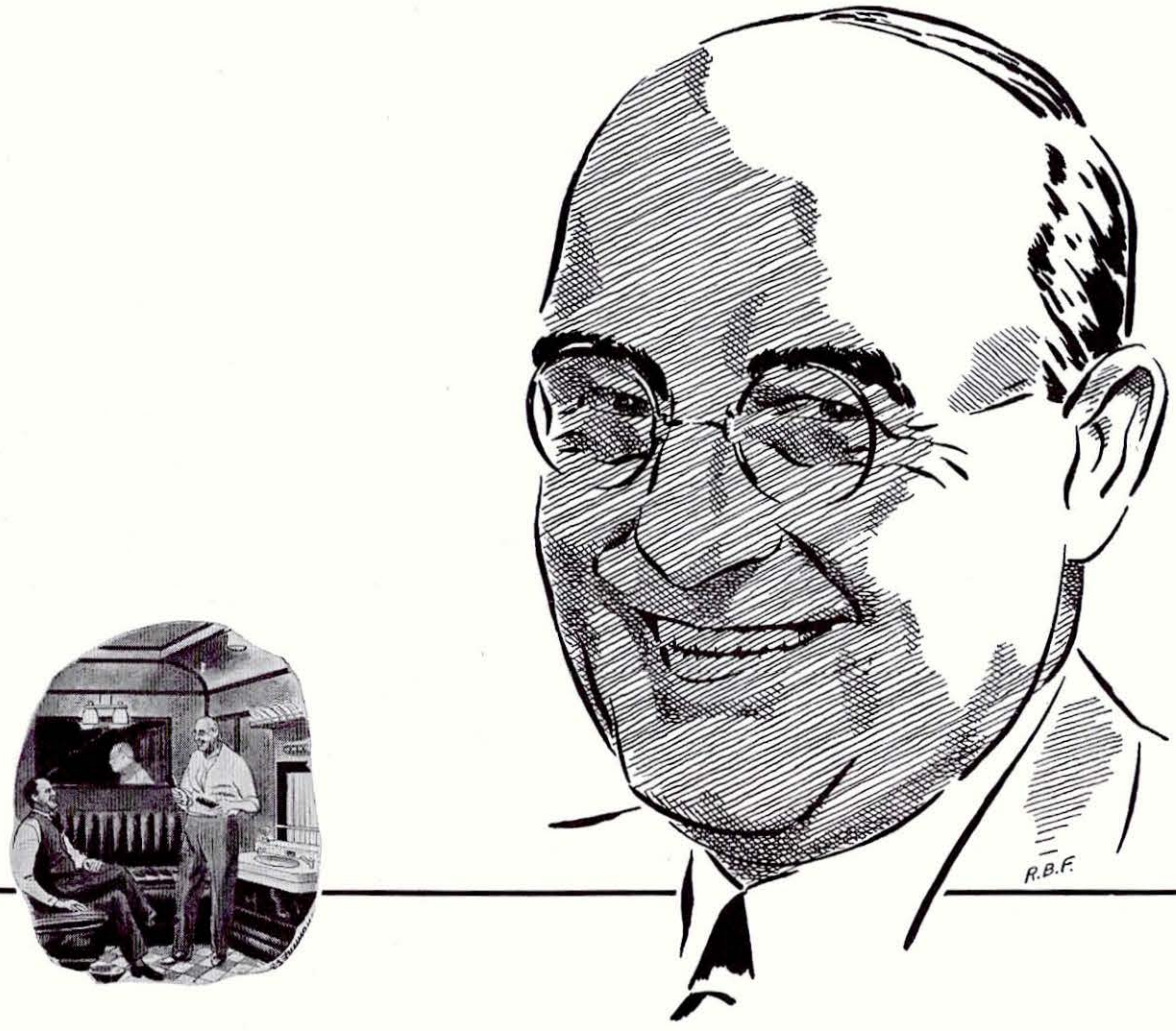

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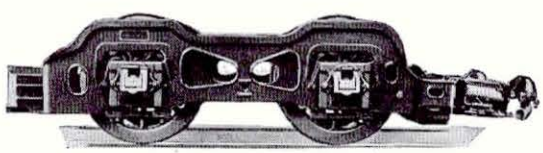

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During the first 75 days of the low fares for Pacific coast travel for the summer period, an increase of 43 per cent was registered over 1935, the total number of travelers by train approximating the business of 1930.

Hudson & Manhattan Files Suit Against Railway Labor Act

The Hudson & Manhattan last week filed bills of complaint in the federal district courts for New York and New Jersey asking injunctions from attempts by United States attorneys to enforce against it the provisions of the Railway Labor Act. The complaint, challenging the recent finding of the Interstate Commerce Commission to the effect that the H. & M. is not entitled to the exemption from the Labor Act which is provided for interurban electric railways, alleges that the road is an interurban electric railway, is not a part of a general system of steam railroad transportation, and, accordingly, that the decision of the I. C. C. is erroneous and should be overturned by the courts. The bill also challenges the constitutionality of the Labor Act, particularly in regard to the heavy criminal penalties imposed for failure to comply with it, which the bill states cannot be constitutionally applied to the H. & M. until after hearing in court as to the correctness of the I. C. C. decision.

Walter F. Brown, chairman of the Hudson & Manhattan's board, said in connection with the suit that "the Hudson tunnels have always been operated on the assumption that they constitute an interurban electric railway. As we have filed reports with the Interstate Commerce Commission on this basis for years, the recent decision of the commission came to us as a complete surprise.

"The statute provides expressly for the exclusion of interurban electric railways, unless they are operated as parts of a general system of steam railroad transportation. Our business is exclusively a passenger business between cities in the metropolitan district, except only that we carry a small amount of United States mail, as do many interurbans. Upon the basis of the facts, as to which there is no dispute, we are wholly unable to understand how the commission reached the conclusion that we should be classified as a general trunk line steam railroad rather than as an interurban electric line. As a matter of fact, all of our activities are similar to those of the subway systems serving the metropolitan district."

Equipment and Supplies

LOCOMOTIVES

THE BIRMINGHAM SOUTHERN is inquiring for 10 Diesel-electric locomotives.

THE CARNEGIE-ILLINOIS STEEL CORPORATION is inquiring for one 0-4-0 type switching locomotive.

THE CONEMAUGH & BLACK LICK has ordered two switching locomotives of the 0-8-0 type from the American Locomotive Company. These locomotives will have 25-in. by 28-in. cylinders and a total weight in working order of 231,000 lb.

THE MEXICAN NATIONAL CONSTRUCTION COMPANY has ordered two articulated locomotives of the 2-6-6-2 type from the American Locomotive Company. These locomotives will have 15-in. by 22-in. cylinders and will weigh 216,000 lb. in working order.

THE MONESSEN SOUTHWESTERN (Pittsburgh Steel Company), reported in the *Railway Age* of July 11 as inquiring for one 0-6-0 switching locomotive, has ordered this equipment from the American Locomotive Company. This locomotive will have 22-in. by 28-in. cylinders and a total weight in working order of 181,000 lb.

FREIGHT CARS

THE YOUNGSTOWN & NORTHERN has ordered 100 all-steel gondola cars of 70 tons' capacity from the Greenville Steel Car Company.

THE UNITED FRUIT COMPANY, New York, recently bought in Germany 150 all-steel banana cars of 12 tons' capacity and 36-in. gauge.

THE BIRMINGHAM SOUTHERN has ordered 100 box cars and 25 gondola cars from the Pullman-Standard Car Manufacturing Company.

THE MISSOURI PACIFIC has asked Federal Judge Charles B. Davis, St. Louis, Mo., for authority to equip 150 additional freight cars with automobile loading devices and modernize such equipment on 208 other box cars, at an estimated cost of $180,850. It is contended by the company that some of its cars are not adapted to loading 1937 model automobiles in Detroit and that the proposed improvements are necessary to meet competition.

PASSENGER CARS

THE STATE RAILWAYS OF URUGUAY have ordered three rail motor cars from the American Car & Foundry Company. A. Marques is locomotive superintendent, the offices of the company are at Avda, 18 de Julio 1546, Montevideo.

IRON & STEEL

THE NEW YORK, CHICAGO & ST. LOUIS has placed an order for 5,800 tons of 112-lb. rails with the Bethlehem Steel Company, the Carnegie-Illinois Steel Company and the Inland Steel Company.

Construction

CHICAGO & NORTH WESTERN.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the installation of approximately five miles of water line between Austin boulevard, Chicago, and Proviso yard, consisting of 14-in. Transite pipe, at a cost of approximately $260,000. Contracts have also been awarded to the Jutton-Kelly Company, Milwaukee, Wis., for the construction of two reinforced concrete and steel highway subways where this company's tracks intersect Silver Spring road and North Port Washington road near Milwaukee.

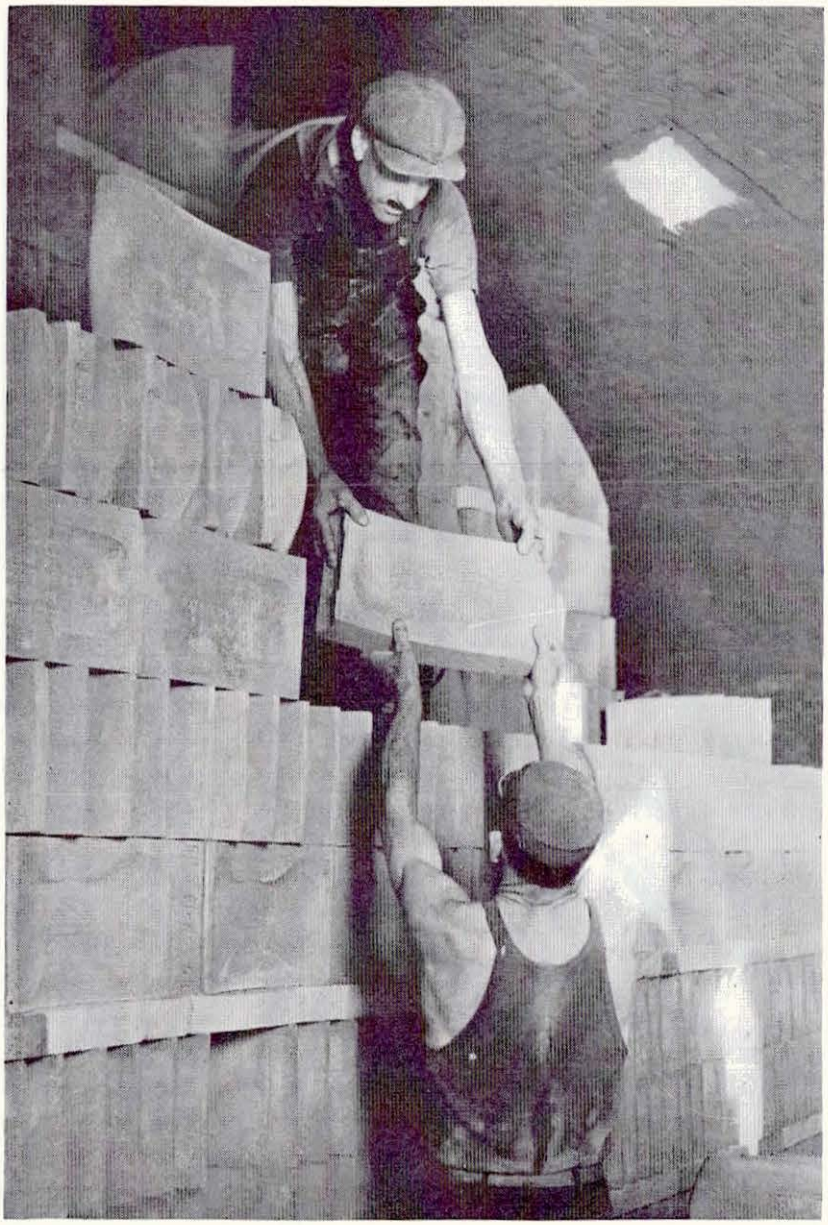
CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—This company is now engaged in renewing two deck plate-girder viaducts on its Kansas City division near Moravia, Iowa. The old structures, which are 960 ft. and 574 ft. long, consist of deck plate-girder spans carried on structural steel towers which are supported on stone masonry pedestals. The new viaducts, which are to be approximately the same length as those replaced, are to be of somewhat similar construction with a heavier design loading and with tower pedestals of reinforced concrete on pile foundations. The concrete substructures are being constructed under contract by the M. M. Moen Company, Mason City, Iowa, and the Stark Construction Company, Cedar Rapids, Iowa, while contracts for fabricating the superstructures have been awarded to the American Bridge Company and the McClintic-Marshall Company. The combined estimated cost of the new structures is approximately $250,000.

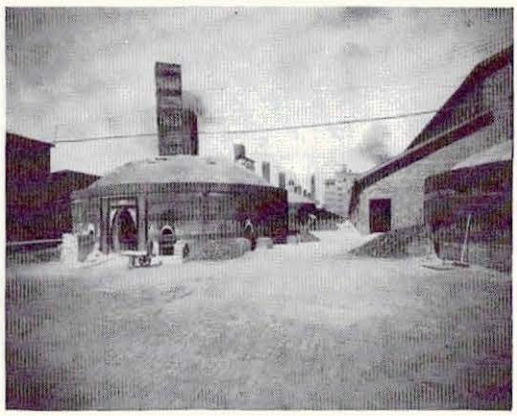
STATEN ISLAND RAPID TRANSIT RAILWAY COMPANY.—This Baltimore & Ohio subsidiary will open bids at 11 a.m. Eastern Standard Time, August 25, at the chief engineer's office, Baltimore, Md., for work in connection with the elimination of grade crossings at Port Richmond and Tower Hill, Staten Island, N. Y.

Continued on next left-hand page

NO. 4 OF A SERIES ON THE MANUFACTURE OF SECURITY ARCH BRICK

HERE ARCH BRICK is made or spoiled





Because of the larger sections the upper half of the kiln only can be utilized for burning Arch Brick.

After all other steps have been completed the burning must be skillfully done.

The setting of the shapes in the kiln requires long experience. Temperature must be accurately controlled from start to finish.

Then the result will be Arch Brick, uniform throughout and each brick like its neighbor.

This uniformity is characteristic of Security Arch Brick and is one of the reasons for its long service — one of the reasons why the cost of Security Brick Arches is less per 1,000-ton miles than it was when locomotive service was less severe.

There's more to Security Arches than just brick

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

Financial

ATCHISON, TOPEKA & SANTA FE.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon the joint use of the tracks and ferry boats of the Southern Pacific between Oakland, Calif., and San Francisco.

ATLANTIC & YADKIN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Stokesdale, N. C., to Madison, 11.31 miles.

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC.—*Valuation.*—The Bureau of Valuation of the Interstate Commerce Commission has prepared for consideration in connection with the reorganization plan a report on the elements of value of this company's properties as of December 31, 1935, finding the original cost of the property owned, excluding land, to be $694,263,606 and the cost of reproduction less depreciation to be $546,341,054.

FLORIDA EAST COAST.—*Abandonment of Key West Extension Proposed.*—The receivers have applied to the Interstate Commerce Commission for a certificate authorizing them to abandon that part of the Key West extension from Florida City, Fla., to Key West, 125 miles, and take up the tracks. The line was opened in January, 1912, having been built to afford a southern terminus with port facilities for shipping on the Gulf of Mexico and to the West Indies but there has been a rapid decline in the traffic since the peak reached in 1927 and in 1934 the revenue was only 25 per cent of what it had been in 1927 and 1928. In September, 1935, a violent storm seriously damaged 40 miles of the line and since then no service has been operated into Key West. Arrangements were made for freight service through Port Everglades by car ferry to Cuba and passenger and l.c.l. service since the storm have been handled by the Peninsular & Occidental Steamship Company in the Miami-Havana service. This is said to be as satisfactory as the former service via Key West and there are no indications that there would be any substantial increase in the volume of through or domestic freight over that handled in recent years if the damage were repaired. As very large expenditures would be required to repair the damage suffered it is believed they would not be justified because the operation of the line would be a drain on the system as a whole. The federal court in charge of the receivership has authorized the filing of the application, stating that it would be inadvisable economically to attempt to reconstruct the line, and that it would be to the best interests of the receivership estate to accept an offer of the Overseas Road and Toll Bridge District, Monroe county, the State Road Department of Florida, and the city of Key West for the purchase of the right of way for use as a highway.

LOUISIANA & ARKANSAS.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue 60,000 shares of prior preferred stock ($50 par), 40,000 shares of 6 per cent preferred ($50 par) and 160,000 shares of no-par common stock—the preferred to be exchanged at parity for similar issues outstanding and the common to be exchanged for present common at 1.6 of new to 1 of old.

LOUISIANA & NORTH WEST.—*Reorganization.*—The Railway Labor Executives' Association, as intervener in the proceedings on the reorganization plan, has asked the Interstate Commerce Commission to re-open them for further evidence, declaring that the plan by which the Louisiana & Arkansas would take over the operation of the property is such as to extend to the L. & N. W. the same management policy toward labor that now dominates the L. & A., and that after the L. & A. management assumed control of the L. & N. W., it adopted a policy of deliberate disregard of the contractual and legal rights of the employees, many of whom were discharged for labor union activity.

MISSOURI PACIFIC.—*Equipment Trust Certificates.*—The trustee of this company has been authorized by the Interstate Commerce Commission to assume liability for $3,490,000 of series AA 3½ per cent equipment trust certificates, maturing 1937-46. The issue is authorized for sale to the Prudential Insurance Company at 102.54, making the cost of the money 2.98 per cent.

NEW YORK CENTRAL.—*Abandonment.*—The Interstate Commerce Commission has authorized this company and the Michigan Central to abandon a branch of the latter company extending from Haakwood, Mich., through Afton, 12.8 miles.

NEW YORK, CHICAGO & ST. LOUIS.—*Securities.*—The Interstate Commerce Commission has authorized this company to issue $16,000,000 of 10-year collateral trust 4 per cent notes to be sold to Edward B. Smith & Co. at 98 (making the interest cost 4.25 per cent) and the proceeds used to discharge indebtedness to banks, the Reconstruction Finance Corporation and the Railroad Credit Corporation.

NEW YORK, NEW HAVEN & HARTFORD.—*Equipment Trust Certificates.*—The trustees have applied to the Interstate Commerce Commission for authority for an issue of $3,075,000 of 3 per cent equipment trust certificates.

Reorganization.—The Manhattan Company and the Reconstruction Finance Corporation have filed briefs with the commission protesting against ratification of the appointment of Howard S. Palmer, James Lee Loomis, and Winthrop M. Daniels, trustees of the New Haven, as trustees also for the Old Colony, taking the position that separate trustees should be appointed to represent the interests of this property.

PENNSYLVANIA.—*Wilkes-Barre Connecting Bonds.*—The Interstate Commerce Commission has authorized this company and the Delaware & Hudson to guarantee $1,093,000 of first and improvement mortgage 3 per cent series A bonds of the Wilkes-Barre Connecting R.R. The bonds, held up to now by the proprietor railroad, are to be sold at 101 at a commission of 0.25 per cent to the brokerage house.

PITTSBURGH & WEST VIRGINIA.—*Notes.*—This company has applied to the Interstate Commerce Commission for authority for a note of $350,000 for three years at 3 per cent from the First National Bank of Chicago, the proceeds of which, together with those from a one-year note for $150,000 at 1½ per cent and a two-year note for $250,000 at 2¼ per cent, are to be used to discharge demand notes to the Union Trust Company, of Cleveland, and the Pennroad Corporation.

WHEELING & LAKE ERIE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a part of a branch line, between a point 2.8 miles west of Carrollton, Ohio, and a point near Sherrodsville, 11.9 miles.

YALE SHORT LINE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon its entire line extending from Casey, Ill., to Yale, 12.5 miles.

Average Prices of Stocks and of Bonds

	Aug. 18	Last week	Last year
Average price of 20 representative railway stocks..	54.36	55.45	36.17
Average price of 20 representative railway bonds..	81.44	81.76	74.27

Dividends Declared

Alabama & Vicksburg.—Capital, 3 per cent, semi-annually, payable October 1 to holders of record September 8.

Chesapeake & Ohio.—70c, quarterly, payable October 1 to holders of record September 8; Preferred, $3.25, semi-annually, payable January 1 to holders of record December 31.

Vicksburg, Shreveport & Pacific.—Preferred, 2½ per cent, semi-annually; Common, 2½ per cent, semi-annually, both payable October 1 to holders of record September 8.

Supply Trade

J. T. Anthony, vice-president of the **General Refractories Company,** will move his headquarters on September 1, from New York to the general offices of the company in the Real Estate Trust building, Philadelphia, Pa.

OBITUARY

Charles S. Cawthorne, assistant treasurer of the American Steel & Wire Company, died in Lake Bluff, Ill., on August 14, of coronary thrombosis.

O. H. Mellum, assistant vice-president of the American Car & Foundry Company, with headquarters at Chicago, was killed in Lake Bluff, Ill., on August 14, when he was struck by a train while alighting from another train at that station.

Continued on next left-hand page

The Superheater

AS A FACTOR IN LOCOMOTIVE DESIGN

Each of the following features is being discussed in this series of advertisements.

Maximum Ton Miles per Hour

•

Boiler Capacity and Tractive Effort

•

Heating Surface and Boiler Capacity

•

Heating Surface and Boiler Efficiency

•

Minimum Draft Loss and Low Back Pressure

•

High Sustained Superheat

•

Higher Superheat and Minimum Steam Consumption

•

Greater Sustained Capacity

•

Reduced Fuel and Water Consumption per Unit of Work Done

•

Total Fuel Consumption of American Railroads

•

Reduced Cost of Locomotive Horsepower

For High Efficiencies Use Elesco Type "E" Superheaters

✓ 9

✓

✓ *Reduced Fuel and Water Consumption per Unit of Work Done*

✓ Locomotives equipped with type "E" superheaters have shown this advantage to a high degree, as compared with other types and designs.

✓ On a test plant in the United States, a locomotive underwent two comparative tests, first equipped with a type "A" superheater and second with a type "E" superheater. Except for the difference in superheaters, the locomotive was identical in each instance. The economies resulting from this test, which are disclosed in the accompanying table, are typical of the results that are being obtained from similar tests.

COAL CONSUMPTION PER IHP

Output IHP	Type "A" Superheater	Type "E" Superheater	Reduction in Pounds	Saving in Per Cent
2000	2.85	2.25	0.6	21.0
3000	3.50	2.75	0.75	21.5
3500	4.25	3.25	1.0	23.5

THE SUPERHEATER COMPANY

Representative of American Throttle Company, Inc.

60 East 42nd Street NEW YORK

ELESCO

Peoples Gas Building CHICAGO

Canada: The Superheater Company, Limited, Montreal

Superheaters • Superheated Steam Pyrometers • Exhaust Steam Injectors • Feed Water Heaters • American Throttles

(A-1085)

Railway Officers

FINANCIAL, LEGAL AND ACCOUNTING

T. H. Cooper, whose appointment as assistant comptroller of the Canadian National at Montreal was reported in the

T. H. Cooper

Railway Age of August 15, started his railway career with the London, Midland & Scottish of Great Britain. He came to Canada in 1912 as clerk in the accounting department of the Grand Trunk, later serving successively as auditor of disbursements, bookkeeper and chief bookkeeper. In 1918 Mr. Cooper was appointed assistant to the general auditor and the following year he became assistant to the comptroller. He was loaned to the Canadian National in 1922 to assist in preparatory work pending the consolidation of the railways and in 1923 he was appointed assistant to the vice-president of finance of the C.N.R. From the latter year until 1929, Mr. Cooper served as general auditor, then becoming assistant comptroller, general accounts. In 1932 he was appointed auditor of general accounts, the position he held at the time of his recent promotion. During the past two and a half years Mr. Cooper has been assigned to special duties reporting to the Chairman of Trustees.

OPERATING

M. N. Hopkins has been appointed superintendent of the New Orleans & Lower Coast (a unit of the Missouri Pacific Lines), with headquarters at Algiers, La., succeeding **L. L. Lowe,** who has been appointed trainmaster on the Arkansas division of the Missouri Pacific, with headquarters at Little Rock, Ark., succeeding **F. O. Garrett,** promoted. Mr. Hopkins will continue to handle the duties of agent.

R. P. Woodman, whose appointment as superintendent of the Massachusetts-Northern New England division of the Railway Express Agency, Inc., with headquarters at Boston, Mass., was announced in the *Railway Age* of August 15, has been in the express business for 31 years. He began his career in 1905 as clerk and later

Jordan Marsh

R. P. Woodman

held various positions in the claim department and the assistant general manager's office. He next served as assistant traveling agent. In 1916 Mr. Woodman went to Boston, Mass., as clerk in the general manager's office and in April, 1920, he was promoted to chief clerk, serving in that position until his recent promotion.

W. H. Tummonds, whose appointment as superintendent of the Northern Ohio division of the Railway Express Agency, Inc., with headquarters at Cleveland, Ohio, was announced in the *Railway Age* of August 15, has been engaged in the express business for the past 37 years. He began his career in Michigan where he held various positions until he became agent at Port Huron. For the next 20 years, Mr. Tummonds served as route agent in the same general territory, operating at different times from Toledo, Ohio;

W. H. Tummonds

Detroit, Mich.; Port Huron and Kalamazoo. In March, 1930, Mr. Tummonds became traffic agent of the Eastern Lakes department, with headquarters at Cleveland, continuing to serve in that capacity until his recent promotion.

Remarkable Passenger Movement in Britain

The August bank holiday witnesses an extraordinary feat of transportation by British railways, buses and boats. Careful estimates disclose the amazing fact that beginning at 8 a.m. on July 31 and ending 40 hours later on August 1 at midnight this year, *one-quarter of the entire population of this country* was on the move to Summer resorts by the sea and inland. No country in the world approaches Great Britain in "tripping" and the Summer bank holiday marks the peak of movement. Railroad terminals in London handled 3,000,000 people. Railways ran 2,000 extra trains and regular express trains ran—some of them—in seven sections. In use were some 20,000 locomotives and train-miles run in the two days reached 4,000,000. This writer has no hesitation in saying that in handling passenger traffic of dimensions such as these, no country can compare with Great Britain.

—Thomas F. Woodlock in the Wall Street Journal (A Dispatch from London)

TRAFFIC

Walter Bockstahler has been appointed merchandise traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md.

H. W. Ward, acting traffic manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been given the full title of traffic manager. Mr. Ward succeeds **B. F. Moffat,** whose appointment as executive representative at Minneapolis was reported in the *Railway Age* of April 4. **E. G. Gustafson,** assistant general freight agent at Chicago, has been appointed to the newly-created position of assistant traffic manager with the same headquarters and with the same territorial jurisdiction as heretofore. **L. Nichols,** assistant general freight agent at Minneapolis, has been appointed to the newly-created position of general freight agent in charge of rates and divisions, with the same headquarters.

W. A. Marshall, whose promotion to assistant to chief freight traffic officer of the Seaboard Air Line at Norfolk, Va., was reported in the *Railway Age* of August 8, was born in Macon, Ga., on May 25, 1891. He was educated in the public schools and prior to entering railway service served two years in the United States Army. He began his railroad career as messenger for the Southern at Atlanta, Ga., in July, 1905, subsequently serving as record clerk, and bill clerk for the same road. In September, 1907, he became receiving clerk for the Nashville, Chattanooga & St. Louis and three years later he went with the Atlanta, Birmingham & Atlantic as quotation and executive rate clerk. From October, 1914, to October, 1920, he served with the Atlantic Coast Line as executive rate clerk. From the latter date to August, 1926, Mr. Marshall served suc-

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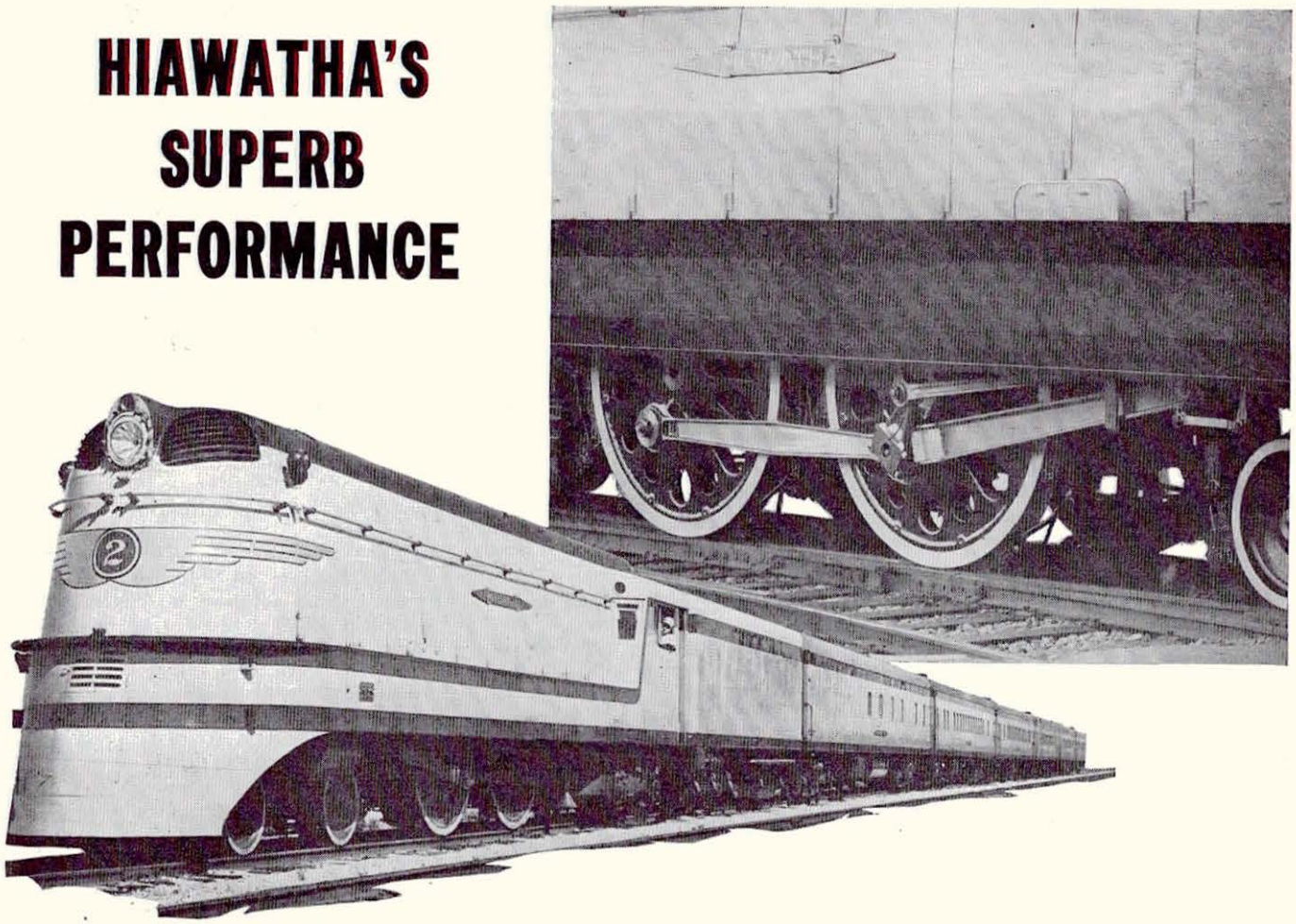
HIAWATHA'S SUPERB PERFORMANCE



Demonstrates the Economic Advantages of Alco Quality Forgings . . .

ALCO

TO go on making this 410-mile high speed run between Chicago, Milwaukee and St. Paul on a 6-hour, 30-minute schedule with sunrise certainty is a noteworthy performance.

It demonstrates unquestionably the absolute necessity for forgings of unusual structural stamina for it is their unfailing endurance which insures the continued serviceability of the entire locomotive unit in this high speed service.

ALCO materials are carefully selected and scrutinized—forging temperatures are scientifically correct—every detail of fabrication is under constant and precise control at all times.

ALCO main rods, side rods, crank pins, axles and other forged parts are on America's fastest locomotives. They are specified for safety—economy—and thorough dependability in every kind of heavy duty and high speed service.

To get ALCO quality, strength and performance you must specify ALCO Forgings.

AMERICAN LOCOMOTIVE COMPANY

ALCO FORGINGS

30 CHURCH STREET · NEW YORK · N.Y.

cessively as executive rate clerk, assistant chief clerk and assistant general freight agent with the Norfolk Southern. He then entered the service of the Seaboard Air Line as assistant general freight agent. He was advanced to the position of senior assistant general freight agent in June, 1929, and in October, 1934, he was further promoted to the position of general freight agent at Norfolk, in which capacity he served until his recent promotion.

Joseph A. Fisher, whose appointment as assistant freight traffic manager of the Reading was noted in the *Railway Age* of

J. A. Fisher

July 25, was born in 1895 and was graduated from Lehigh University as a civil engineer in 1917. On October 1, 1921, he entered the service of the Reading as special agent in the office of the division freight agent and on June 1, 1922, he became freight traffic representative in that office. Mr. Fisher was appointed chief clerk to vice-president, traffic, on January 1, 1925, and on December 1, 1925, he became foreign freight agent. He was appointed assistant general freight agent on May 1, 1928, and on April 1, 1935, he was appointed general freight agent, the position he held at the time of his appointment as assistant freight traffic manager.

H. B. Light, whose appointment as general freight agent of the Reading, with headquarters at Reading, Pa., was an-

H. B. Light

nounced in the *Railway Age* of July 25, was born at Lebanon, Pa., on August 22, 1893. He was educated in the Lebanon High school and entered railway service with the Reading in September, 1911, as clerk in the freight office at Lebanon. For two years he served in the accounting department of the New York, New Haven & Hartford at Boston, Mass., and then for seven years he was engaged in industrial work. Mr. Light entered the freight traffic department of the Reading in August, 1922, as rate clerk at New York. In September of the same year he was appointed chief clerk at that point. He was appointed freight traffic representative at New York in April, 1923, serving in that position until January, 1926, when he was promoted to the position of assistant general agent. The following year he was appointed general agent. In May, 1928, Mr. Light was sent to Philadelphia, Pa., as coal freight agent. He was promoted to the position of assistant general freight agent with the same headquarters, in April, 1935, and served in that position until his recent promotion.

MECHANICAL

J. M. Kerwin, superintendent motive power of the Chicago, Rock Island & Pacific, with headquarters at Silvis, Ill., has moved his headquarters to Kansas City, Mo.

John Pfeiffer, superintendent motive power of the Ft. Worth & Denver City, has been appointed also to the same position on the Colorado & Southern to succeed **H. W. Ridgway,** who has retired. Mr. Pfeiffer will maintain offices at both Denver, Colo., and Childress, Tex.

Walter E. Sample, supervisor of locomotive operation of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., has been appointed assistant to chief of motive power and equipment, with headquarters at Baltimore, Md., succeeding **Fred Kirby,** deceased. **H. T. Clark,** road foreman of engines, has been appointed supervisor of locomotive operation at Pittsburgh, to succeed Mr. Sample.

C. P. Dampman, supervisor of fuel conservation of the Reading, at Philadelphia, Pa., has been granted an indefinite leave of absence on account of illness. The jurisdiction of **H. Morris,** superintendent fuel and locomotive performance of the Central of New Jersey at Jersey City, N. J., has been extended to include the Reading Company. **H. W. Cathcart** has been appointed assistant superintendent fuel and locomotive performance for both roads and the position of fuel inspector of the Reading has been abolished.

MOTOR TRANSPORT

John J. Shaughnessy, western traffic manager of the Santa Fe Trail Stages, who has been appointed traffic manager of the highway motor transport department of the Atchison, Topeka & Santa Fe, as reported in the *Railway Age* of August 1, was born on June 17, 1903, at Walla Walla, Wash. Mr. Shaughnessy received his higher education at Whitman college, graduating in 1926. He first entered the motor transport field in 1925 with the Blue Line Motor Coach interests and served with various bus and truck companies until 1935, when he became affiliated with the Santa Fe Trail Stages as assistant

John J. Shaughnessy

traffic manager. In November of the same year he was advanced to western traffic manager, which position he was holding at the time of his recent appointment as traffic manager of the Santa Fe's highway motor transport department, with headquarters at Chicago.

OBITUARY

Edwin P. Bates, who retired on October 1, 1931, as assistant freight traffic manager of the Pennsylvania at Philadelphia, Pa., died at his home in St. Davids, Pa., on August 14, after a short illness. Mr. Bates was 75 years old.

George James, superintendent freight loss and damage prevention of the Cleveland, Cincinnati, Chicago & St. Louis, died on July 31 at his home at Indianapolis, Ind., following an illness of several months.

George W. Squiggins, assistant to the general passenger traffic manager of the Baltimore & Ohio, with headquarters in Baltimore, Md., died at his home in that city on August 13 of a heart attack. Mr. Squiggins was born on September 29, 1864, in Marshall County, W. Va. He entered the service of the B. & O. in 1887 as a yard clerk. In 1888 he became city ticket agent serving first at Bellaire, Ohio, and then in Wheeling, W. Va. He was appointed city passenger agent at Pittsburgh, Pa., in 1896, and in 1898 he was transferred to Cleveland, Ohio, as passenger and ticket agent. Mr. Squiggins became traveling passenger agent at that point in 1902 and three years later was put in charge of the city passenger offices in that city. In 1909 he was promoted to division passenger agent at Baltimore and the following year he was further advanced to the position of assistant general passenger agent. He became general passenger agent of the eastern lines in September, 1911, being transferred in the same capacity to Cincinnati, Ohio, in 1916. Mr. Squiggins was appointed assistant to the general passenger traffic manager at Baltimore in February, 1934, and served in that position continuously until his death.

Table of Operating Revenues and Expenses appears on next left-hand page

ATTRACTING NEW BUSINESS

The long record of "Union" Centralized Traffic Control in eliminating delays, increasing G.T.M. per train hour and reducing the cost of transportation, while increasing the safety of train operation, marks it as one of the greatest developments in expediting train movements. Expedited traffic attracts new patronage and results in an immediate return on the investment. Consult our nearest office for details. » » »

1113

1881 **Union Switch & Signal Co.** 1936

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from 140 Monthly Reports of Revenues and Expenses Representing 144 Class I Steam Railways

FOR THE MONTH OF JUNE, 1936 AND 1935

Item	United States		Eastern District		Southern District		Western District	
	1936	1935	1936	1935	1936	1935	1936	1935
Average number of miles operated	236,812	238,019	58,544	58,987	44,935	45,245	133,333	133,787
Revenues:								
Freight	$268,542,212	$225,758,649	$114,130,988	$100,318,871	$50,945,108	$45,624,472	$103,466,116	$79,815,306
Passenger	34,845,034	31,048,774	19,188,086	17,912,625	4,023,016	3,457,629	11,633,932	9,678,520
Mail	7,705,334	7,395,209	2,973,895	2,829,889	1,341,879	1,286,999	3,389,560	3,278,321
Express	5,026,483	4,212,219	2,008,555	1,593,605	780,432	709,886	2,237,496	1,908,728
All other transportation	7,055,579	6,142,500	3,739,974	3,343,120	644,967	564,313	2,670,638	2,235,067
Incidental	6,811,045	6,139,087	3,534,156	3,144,795	788,736	794,841	2,488,153	2,199,451
Joint facility—Cr.	932,347	819,183	270,858	237,072	232,432	218,761	429,057	363,350
Joint facility—Dr.	226,521	187,562	49,870	51,582	21,796	17,704	154,855	118,276
Railway operating revenues	330,691,513	281,328,059	145,796,642	129,328,395	58,734,774	52,639,197	126,160,097	99,360,467
Expenses:								
Maintenance of way and structures	42,643,920	37,058,846	15,963,165	13,509,722	6,976,900	6,219,478	19,703,855	17,329,646
Maintenance of equipment	64,138,263	56,076,421	28,620,118	24,812,034	11,689,363	10,429,033	23,828,782	20,835,354
Traffic	8,712,399	8,257,514	3,221,364	3,058,134	1,560,645	1,497,811	3,930,390	3,701,569
Transportation	110,702,816	101,343,297	50,771,602	46,796,488	17,882,222	17,007,669	42,048,992	37,539,140
Miscellaneous operations	2,855,102	2,507,177	1,278,099	1,127,742	282,230	265,275	1,294,773	1,114,160
General	13,269,534	11,604,482	5,874,444	5,442,597	2,229,297	2,058,685	5,165,793	4,103,200
Transportation for investment—Cr.	510,480	297,479	42,821	47,863	104,476	64,115	363,183	185,501
Railway operating expenses	241,811,554	216,550,258	105,685,971	94,698,854	40,516,181	37,413,836	95,609,402	84,437,568
Net revenue from railway operations	88,879,959	64,777,801	40,110,671	34,629,541	18,218,593	15,225,361	30,550,695	14,922,899
Railway tax accruals	26,842,213	20,451,394	11,502,061	8,761,703	5,440,206	3,995,291	9,899,946	7,694,400
Railway operating income	62,037,746	44,326,407	28,608,610	25,867,838	12,778,387	11,230,070	20,650,749	7,228,499
Equipment rents—Dr. balance	8,153,643	7,059,812	3,635,656	3,430,055	605,853	345,016	3,912,134	3,284,741
Joint facility rent—Dr. balance	3,571,522	3,163,892	1,902,199	1,735,390	519,165	348,229	1,150,158	1,080,273
Net railway operating income	* 50,312,581	† 34,102,703	23,070,755	20,702,393	11,653,369	10,536,825	15,588,457	2,863,485
Ratio of expenses to revenues (per cent)	73.12	76.97	72.49	73.22	68.98	71.08	75.78	84.98
Depreciation included in operating expenses	16,085,159	16,301,504	7,003,239	7,134,778	3,164,845	3,181,533	5,917,075	5,985,193
Total maintenance before depreciation	90,697,024	76,833,763	37,580,044	31,186,978	15,501,418	13,466,978	37,615,562	32,179,807
Net railway operating income before depreciation	66,397,740	50,404,207	30,073,994	27,837,171	14,818,214	13,718,358	21,505,532	8,848,678

FOR SIX MONTHS ENDED WITH JUNE, 1936 AND 1935

Average number of miles operated	237,026	238,187	58,649	58,988	44,944	45,250	133,433	133,949
Revenues:								
Freight	$1,525,716,386	$1,320,340,300	$665,072,803	$586,627,563	$305,161,941	$266,367,792	$555,481,642	$467,344,945
Passenger	192,368,611	170,780,488	109,452,399	100,325,734	27,647,784	23,859,732	55,268,428	46,595,022
Mail	45,983,373	45,076,679	17,638,012	17,307,955	8,263,079	8,010,523	20,082,282	19,758,201
Express	28,723,637	27,357,104	11,314,607	10,679,247	6,556,556	6,746,134	10,852,474	9,931,723
All other transportation	40,425,097	36,082,554	21,324,523	19,566,164	4,063,818	3,655,920	15,036,756	12,860,470
Incidental	35,721,126	32,380,795	19,294,755	17,339,024	5,415,683	5,122,806	11,010,688	9,918,965
Joint facility—Cr.	5,398,042	4,730,994	1,629,973	1,486,970	1,192,664	1,085,673	2,575,405	2,158,351
Joint facility—Dr.	1,407,405	1,212,979	301,555	343,801	126,832	102,264	979,018	766,914
Railway operating revenues	1,872,928,867	1,635,535,935	845,425,517	752,988,856	358,174,693	314,746,316	669,328,657	567,800,763
Expenses:								
Maintenance of way and structures	216,726,547	183,590,131	84,235,213	70,460,278	39,600,999	36,816,112	92,890,335	76,313,741
Maintenance of equipment	380,576,140	333,621,740	172,560,385	149,466,725	69,267,399	63,513,920	138,748,356	120,641,095
Traffic	49,112,598	46,995,368	18,084,460	17,554,358	9,631,430	9,073,896	21,396,708	20,367,114
Transportation	681,611,540	612,381,300	315,214,330	285,089,650	113,846,510	104,195,311	252,550,700	223,096,339
Miscellaneous operations	16,642,830	14,698,101	7,698,590	6,906,124	2,264,118	1,968,632	6,680,122	5,823,345
General	78,450,471	70,048,701	34,533,000	32,730,975	13,316,749	12,528,765	30,600,722	24,788,961
Transportation for investment—Cr.	1,738,697	1,389,489	182,137	319,088	236,955	202,652	1,319,605	867,749
Railway operating expenses	1,421,381,429	1,259,945,852	632,143,841	561,889,022	247,690,250	227,893,984	541,547,338	470,162,846
Net revenue from railway operations	451,547,438	375,590,083	213,281,676	191,099,834	110,484,443	86,852,332	127,781,319	97,637,917
Railway tax accruals	148,668,143	121,312,664	61,897,687	49,749,585	30,845,650	25,519,124	55,924,806	46,043,955
Railway operating income	302,879,295	254,277,419	151,383,989	141,350,249	79,638,793	61,333,208	71,856,513	51,593,962
Equipment rents—Dr. balance	45,336,756	41,607,246	21,426,623	20,328,416	2,821,258	2,835,714	21,088,875	18,443,116
Joint facility rent—Dr. balance	19,298,604	17,893,718	10,564,415	10,193,065	2,300,401	1,835,748	6,433,788	5,864,905
Net railway operating income	‡ 238,243,935	§ 194,776,455	119,392,951	110,828,768	74,517,134	56,661,746	44,333,850	27,285,941
Ratio of expenses to revenues (per cent)	75.89	77.04	74.77	74.62	69.15	72.41	80.91	82.80
Depreciation included in operating expenses	96,780,271	97,529,343	42,119,683	42,413,606	19,144,807	19,052,285	35,515,781	36,063,452
Total maintenance before depreciation	500,522,416	419,682,528	214,675,915	177,513,397	89,723,591	81,277,747	196,122,910	160,891,384
Net railway operating income before depreciation	335,024,206	292,305,798	161,512,634	153,242,374	93,661,941	75,714,031	79,849,631	63,349,393

* Includes charges to Railway Tax Accruals in the total amount of $5,176,661, itemized as follows: $1,472,056 for taxes under the requirements of the Social Security Act of 1935 and $3,704,605 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes (Public No. 400, 74th Congress).

† Includes credits to General Expenses in the amount of $1,087,941 on account of reversal of charges previously made for liability under the Railroad Retirement Act of 1934.

‡ Includes charges to Railway Tax Accruals in the total amount of $24,392,476, itemized as follows: $8,620,018 for taxes under the requirements of the Social Security Act of 1935 and $15,772,458 under the requirements of an Act approved August 29, 1935, levying an excise tax upon carriers and an income tax upon their employees, and for other purposes (Public No. 400, 74th Congress).

§ Includes credits to General Expenses in the amount of $5,517,768 on account of reversal of charges previously made for liability under the Railroad Retirement Act of 1934.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

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WEARING parts in the valves and cylinders made from HUNT-SPILLER *Air Furnace* GUN IRON are acknowledged to be one of the most important factors contributing to the economical consumption of fuel.

Their resistance to frictional wear and high temperatures assures steam tight operation and maximum service between renewals.

Every bit of steam flowing to the cylinders must do full duty — less coal is required to do a given amount of work and maintenance records never fail to show a substantial drop in the upkeep of valves and cylinders.

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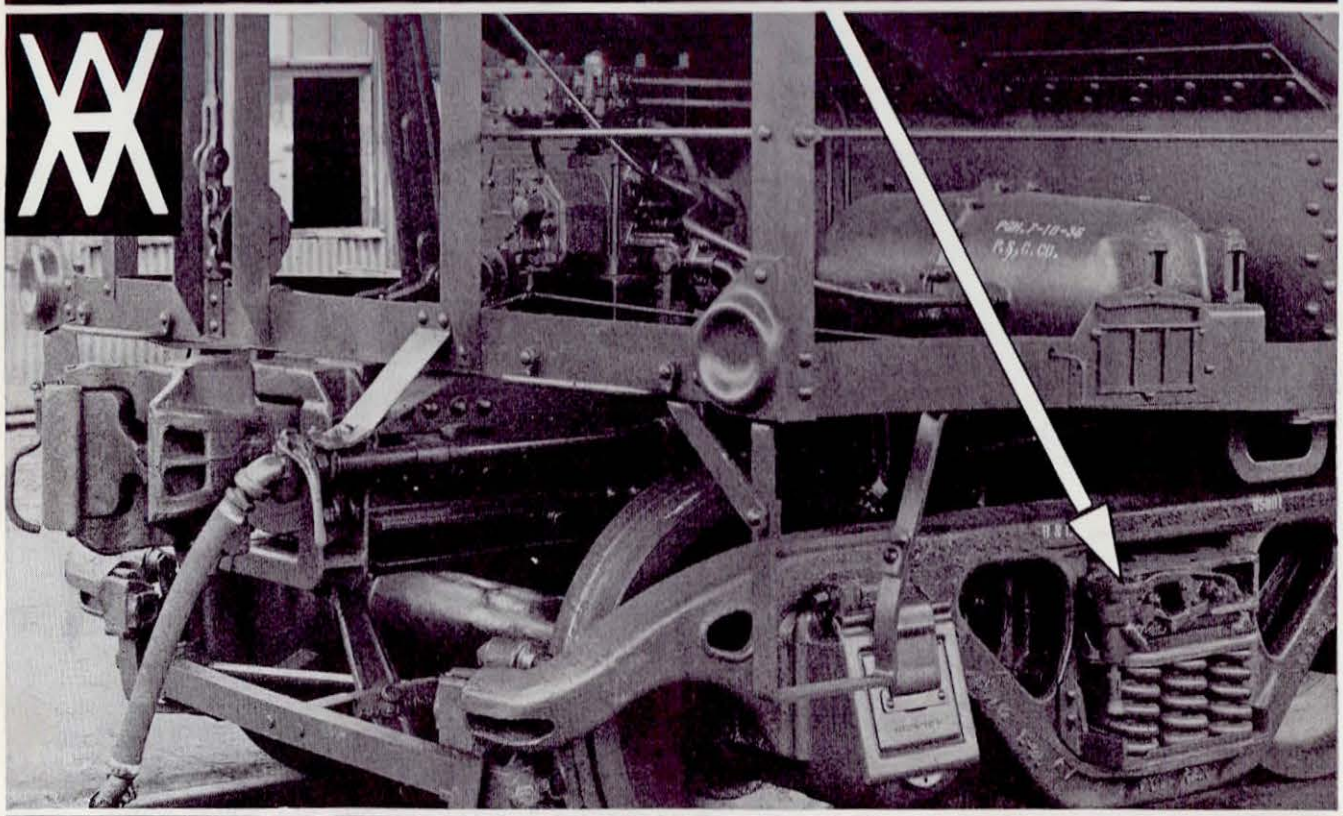

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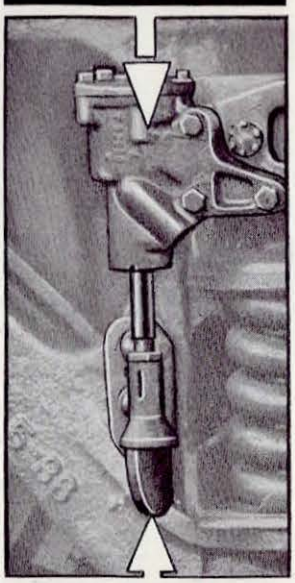

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WAUGH-GOULD Type 403 Draft Gear for freight cars is designed to withstand the heaviest kind of blows while providing full protection for lading and equipment throughout many years of heavy-duty service. Awarded A.R.A. Certificate No. 1.

Waugh Type P Draft Gear for passenger cars has soft initial action with smooth and instant response to speed changes during brake applications ... No erratic action occurs to cause train disturbances.

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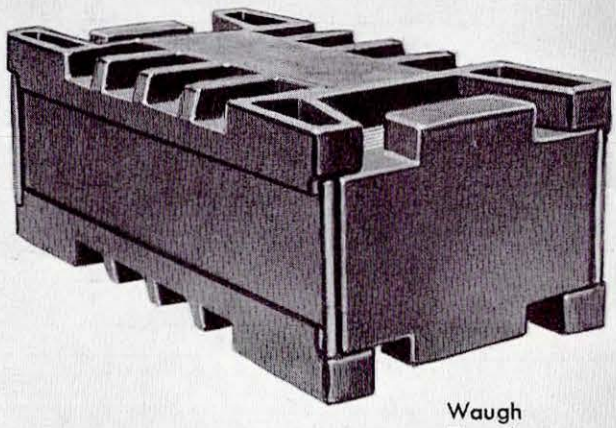
Canadian Waugh Equipment Co., Ltd., Montreal



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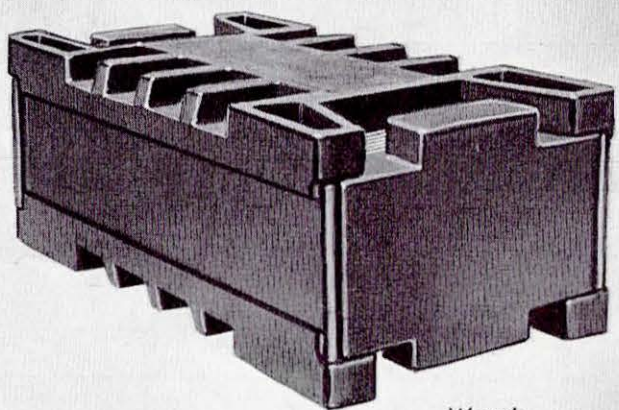

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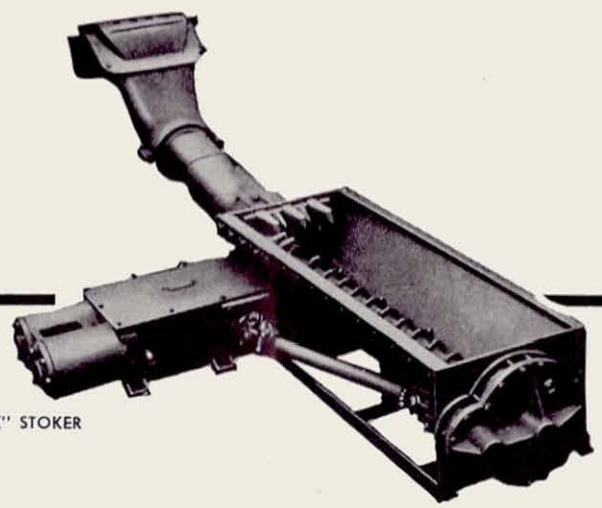

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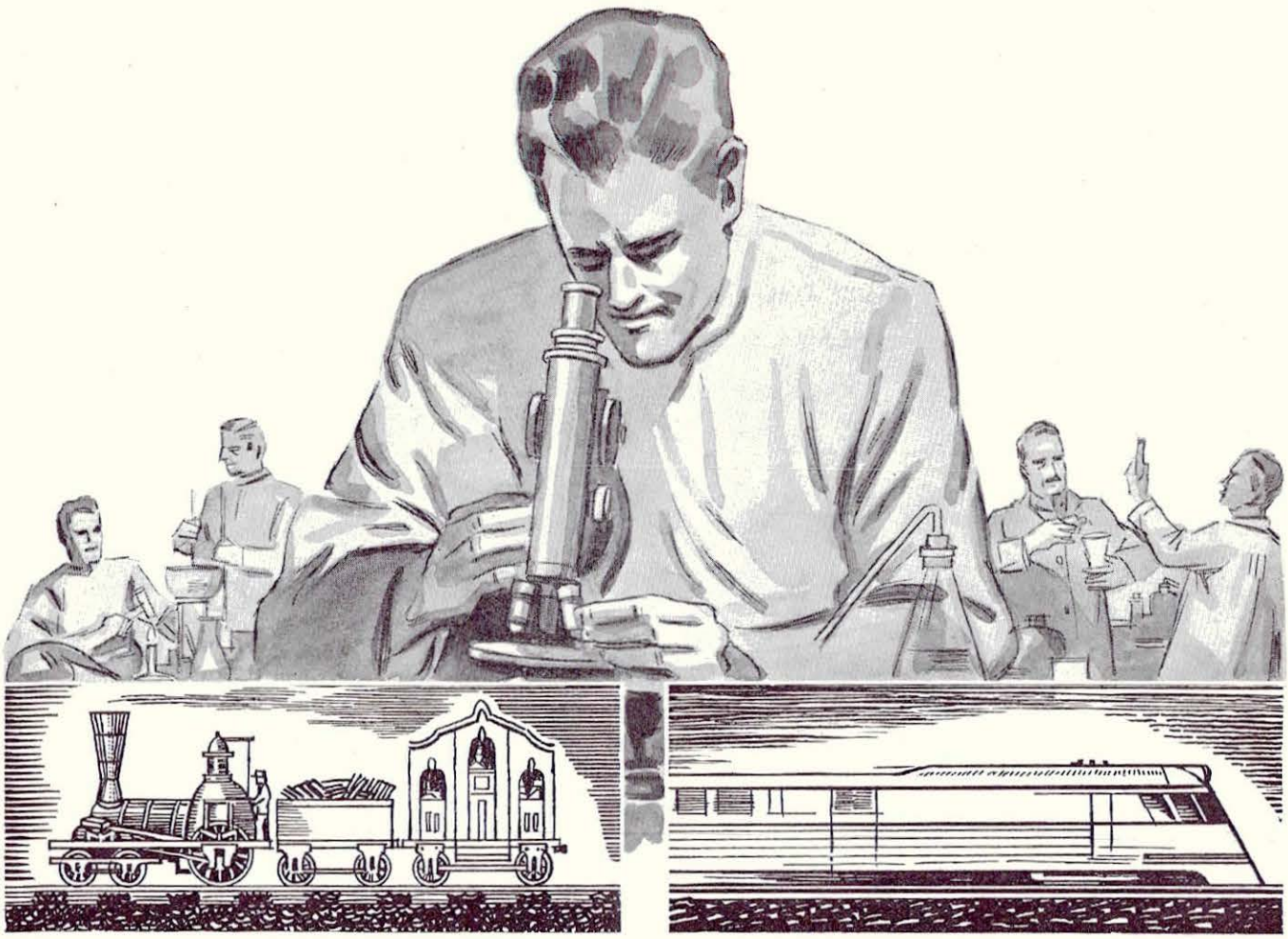

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3

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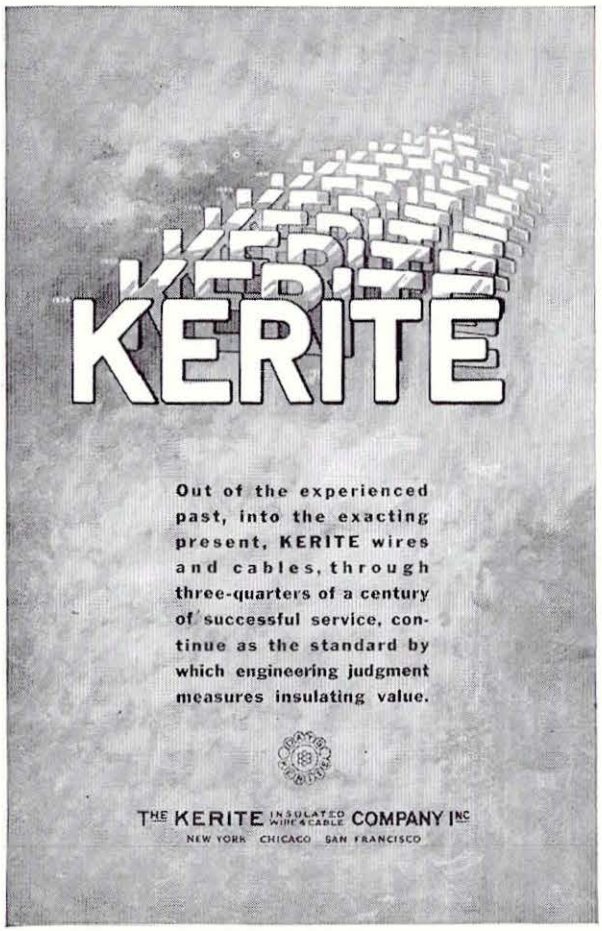
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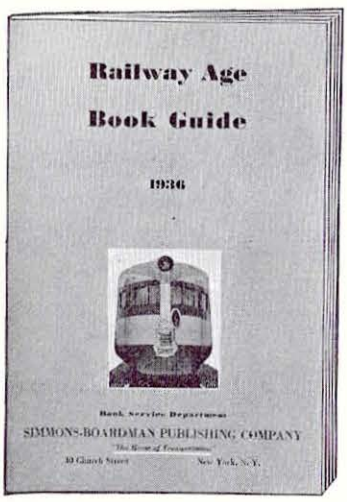

Books of interest to readers of "Railway Age" that have been published during the past decade and are still in print are described in this handy catalog. They are classified under general subject headings and arranged in chronological order. There is a title index to facilitate quick reference.

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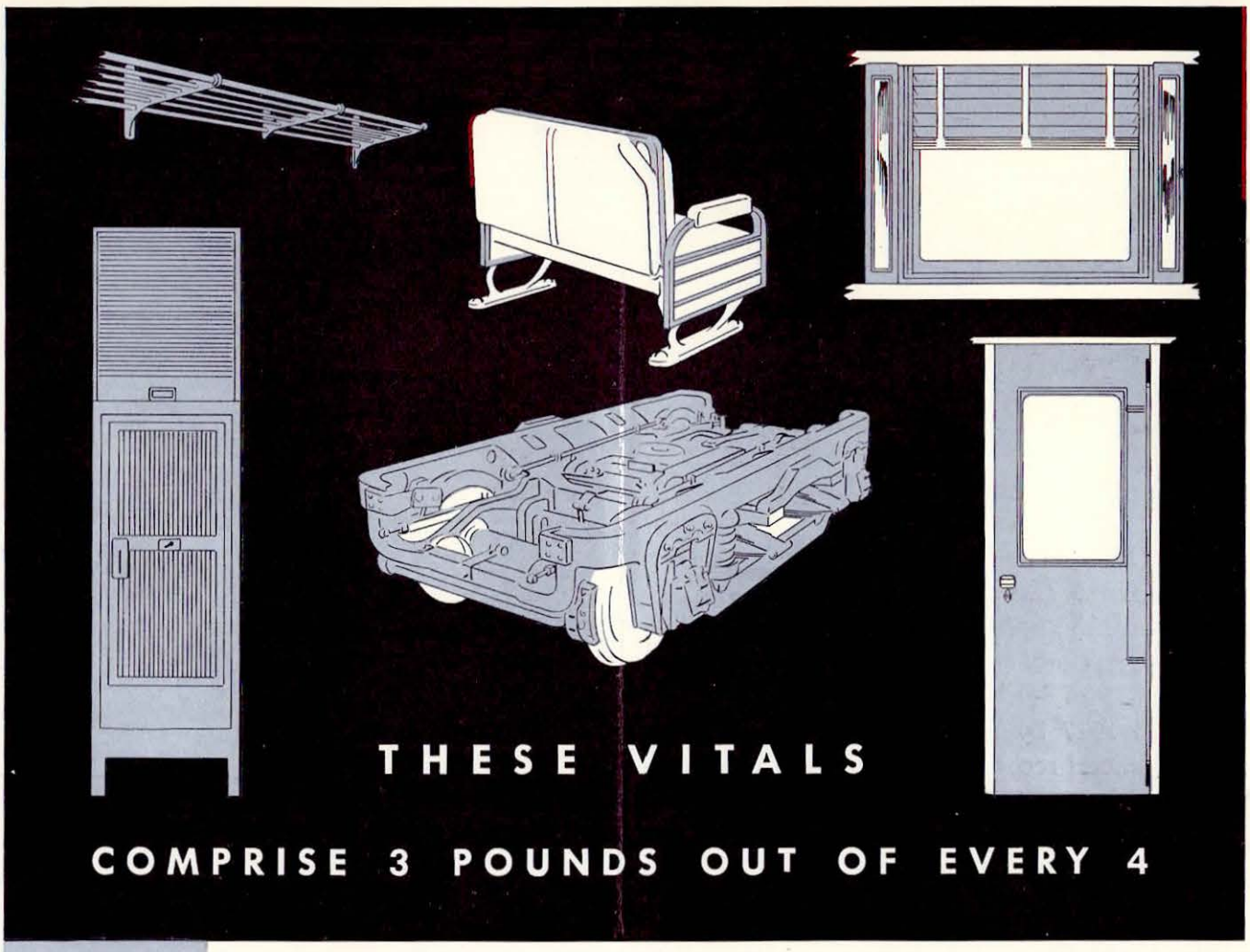

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COMPRISE 3 POUNDS OUT OF EVERY 4

ALCOA

To the passenger, these auxiliary parts are vital factors in rail travel. Seats, parcel racks, lights, windows, doors, air conditioning and interior finish determine his comfort; his safety depends on brakes and trucks.

To operating economy, the auxiliary parts are just as vital, for they comprise 3 out of every 4 pounds of total passenger coach weight. Lick the dead-weight problem in them, and the dead-weight problem is 75% licked for the whole coach.

That is why alert equipment manufacturers are ready to supply you with specialties freed from dead-weight by the lightness of Alcoa Aluminum. The fundamental reasoning underlying the use of Aluminum in these parts is this: Nature made Aluminum light; therefore Aluminum can be used, and weight saved, without sacrificing the strength which results from thick, stiff sections of metal.

Practically all kinds of equipment are now available in Alcoa Aluminum. Consult equipment manufacturers when you are considering the specification of light-weight, Aluminum specialties. Consult us when problems of design, fabrication, or repair arise; our "know-how," gained from years of experience in developing uses for Aluminum, will be valuable to you, and there is no obligation. ALUMINUM COMPANY OF AMERICA, 2178 Gulf Building, Pittsburgh, Pa.

ALCOA ALUMINUM

Modern signal systems keep trains moving

"It is the moving train which performs the service and earns the money, while the standing train earns no money and is, in fact, a liability." This statement, made in 1917 by a railway operating officer, bears repeating today when, despite the general recognition of the economic value of modern signaling, trains are operated under the train order system on 234,183 miles of road.

A train order, ordinarily prepared on estimates of future performance, takes into account the movements to be made during an hour or more (often several hours) after the order is issued. Failure by the superior train to meet the expected performance ties up the inferior train. Because the train order system requires so much time it is not always possible to afford relief to the inferior train by new orders and substantial delays are unavoidable.

Under *operation by signals* no time is required to change the line-up. The dispatcher can operate from minute to minute instead of from hour to hour.

By directing train movements by signal indications in place of by train orders, slow-downs or stops for orders are eliminated and *trains are kept moving*.

When passing siding or other switches are operated by interlocking, remote power switch machines, or centralized traffic control, the train-stops to throw switches are eliminated and *trains are kept moving*.*

* Extract from report on Train Operation by Signal Indication setting forth the increased efficiency secured in railway operation by signal indications in lieu of train orders and time table superiorities, A.R.A. S.S. Proceedings, Vol. XXVII.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, N. Y.

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HISTORY IN THE MAKING

The I.C.C. Tabulations of Statistics show that train movements were directed by train orders on 247,967 miles of road in 1917, as against 234,183 miles of road in 1936.